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State Mineralogist
OF THE
STATE OF NEVADA,
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FOR THE YEARS 1877 AND 1878.



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ISABELL GROTENATZ

REPORT.

To the Honorable the Senate and Assembly of the State of Nevada :

Gentlemen : I herewith submit my fourth biennial report. It contains such information concerning the mining and other resources of the State as I am required by law to report upon.

Very respectfully,

Your obedient servant,

H. R. WHITEHILL,

State Mineralogist.

RESOURCES OF NEVADA.

The general surface of Nevada is a table land, bounded on the west by the lofty Sierra Nevada range of mountains, and traversed in a northerly and southerly direction by numerous parallel ranges which have an altitude of about nine thousand feet. The long valleys between vary in elevation from four thousand to six thousand feet. With the exception of the south-east corner, which is a part of the Colorado basin, and a narrow strip to the north, which is drained by the Snake River, the State lies wholly in what is called the Great Basin. Were this region unbroken, and a plateau of uniform surface and height, it would be another Sahara in barrenness and extent. Instead, there are many fertile valleys and living streams of water. In these mountain ranges are accumulated in winter vast quantities of snow, which, melting during the summer, affords large supplies for irrigation.

The limits of the State of Nevada were extended by an Act of Congress, approved May 5, 1866. Its boundaries are now as follows: Commencing at a point formed by the intersection of the thirty-eighth degree of longitude west from Washington with the forty-second degree of north latitude; thence due south along said thirty-eighth degree of longitude to the middle of the Colorado River; thence down the middle of the river to the eastern boundary of the State of California; thence in a north-westerly direction along the said eastern boundary line to the forty-third degree of longitude west from Washington; thence north along said forty-third degree of longitude to the forty-second degree of north latitude; thence due east along the forty-second degree of latitude to the place of beginning.

It has been demonstrated by the geological explorations on the fortieth parallel, that the Nevada ranges of mountains belong to the same system of upheavals which took place during the Jurassic period. These immense mountain masses are composed of sedimentary strata, granite and kindred formations and volcanic rocks. The stratified beds comprise the largest portion, and extend from the Azoic age up to the time of upheaval. The rock formations embrace nearly every species of sedimentary or eruptive products existing, from the earliest to the most recent period. In the mountains which skirt upon the Sierras, the eruptive rocks prevail, while farther east are found the metamorphic and sedimentary formations. Metalliferous deposits and veins exist in all the mountain ranges, the most productive of which still continues to be the Comstock lode.

The valleys, in general, correspond with the mountain ranges. They are sometimes short, being intersected by the low mountains, which in many places link together the parallel ranges, running north and south, but usually they are long and narrow. With but slight elevations, sev-

eral openings are found, extending from the Humboldt River to the Colorado, the southern limit of the State. Many of the valleys are dry and unfit for cultivation; some are covered with alkali and sand, while others are scarcely less productive than the most fertile valleys of California. All have been mainly filled by the products of erosion.

MINERAL RESOURCES.

Of the productions of Nevada, silver and gold are beyond comparison the most important. Scarcely twenty years have elapsed since this State was inhabited only by the red man, and a few Mormon settlers in Carson Valley; and yet during this time the enormous sum of three hundred and fifty million dollars in silver and gold have been produced from the Nevada mines. More than two thirds of this yield has been since the year eighteen hundred and seventy-one. The most productive year was eighteen hundred and seventy-seven, the bullion shipments amounting to fifty-one million three hundred sixty-eight thousand nine hundred and seventeen dollars. The yield for eighteen hundred and seventy-eight was thirty-five million one hundred eighty-one thousand nine hundred and forty-nine dollars, a falling off from the year previous of sixteen million three hundred ninety-eight thousand three hundred and forty-one dollars. From these figures it may be seen that the past two years has been a period of unexampled prosperity in the history of the State, and that the labor of the miner has met with merited reward. From the experience of the past, coupled with the condition and indications of the various mining districts at present, it may readily be inferred that Nevada's resources in silver and gold are practically without limit; and that the supply is still so great that a long time must elapse before it can be exhausted. So fruitful, indeed, has been the yield, that the last decade forms a new era in the history of the precious metals in America; and the new discoveries being made in every direction promise still better results for the future.

Although silver and gold are the chief products of the State, there are other mineral resources which are of no mean importance. The lead product of eastern Nevada has increased so rapidly during the past two years, that Eureka now stands at the head of the lead-producing districts in the United States. Tybo too is making rapid strides in the way of advancement. The product of these two districts falls but little short of that of Missouri, Iowa and Illinois combined.

The deposits of borax in Churchill and Esmeralda Counties are sufficient to supply the demands of the world, but being situated so far away from the markets, the expense of transportation and the reduced price of the article, has placed a limit upon its production. Fish Lake, Columbus, and Teal's Marsh have an almost inexhaustible supply, and their thousands of acres must some day be profitable to the owners.

The salt deposits are beyond computation. In Humboldt, Churchill, Esmeralda, Lander, White Pine and Lincoln Counties there are beds of salt, covering thousands of acres and of unknown depths. The waters of North Soda Lake, in Churchill County, two hundred and seventy feet in depth and covering an area of four hundred acres, contain about thirty-three per cent. of soda. Sulphur is found in immense deposits in Humboldt County, and in a comparatively pure state. Antimony in paying quantities is found in a dozen districts, and mines rich in copper are be-

ing worked in Lander and White Pine Counties. Cinnabar, occurring in brilliant red crystals, and also in amorphous masses, is found in Washoe and Nye Counties. Gypsum, plumbago, manganese, cobalt, arsenic, magnesia, alum, nickel, nitre, iron of good quality, coal in small quantities, isinglass—such are some of the mineral products of Nevada, which will in the future produce some revenue to the people and State.

PERMANENCY OF THE MINES.

This is a subject which has received a great deal of attention, both at home and abroad. It is one of the greatest importance to every one interested in the prosperity of the State, for upon it are based all calculations for the future. Without confidence in the permanence of the mining interests of the State, few capitalists are willing to invest their means in uncertain explorations. Apart from the geological proofs of the continuance of true fissures to great depths; apart from the developments lately made on the lowest levels of the Comstock lode, and the character of the bonanza now being opened up, there is other evidence which is suggestive of the permanency of the Nevada mines, and, as such, is worthy of consideration. A comparison of the mining industries of Nevada with those of the other silver producing districts of the world, shows the former yet in their infancy. Not young, indeed, nor inferior in the class of machinery employed, nor in the various contrivances for working the ores, since they are of the most improved and costly kinds; not inferior in the richness and abundance of the ore itself; but young in years, and in the amount of prospecting done, and in the quantity of bullion produced. Modern improvements and inventions have been introduced; discoveries have been made; towns have sprung up as if by magic; civilization has advanced to the very center. And yet there is many a mountain slope into which the pick of the miner has not entered; there is many an ore deposit which the bold prospector has not yet found. The riches of Ely District, Columbus, Eberhardt, Tuscarora, Lander Hill, Ruby Hill and the Comstock, may have their parallels in hills yet unsurveyed, and mountain sides now bare and desolate may in the future teem with enterprise and life. Reasoning from analogy, we are encouraged in the belief that the mining resources of the State are likely to be permanent. Owing to the improvements in the appliances for mining and metallurgy, and in the various processes for working silver ores, it is not to be inferred that because the mines of one country have been worked for many centuries in the past, the mines of another country are likely to be productive for so long a time, yet a brief review of the condition of the various silver producing districts of the world, is certain to increase our expectations in regard to the permanency of the mines of Nevada.

The Spanish mines were worked so early that the history of their discovery is known only by tradition. Yielding vast quantities of silver in the time of Solomon; a source of wealth to the Arabs and Romans; furnishing the Carthaginians means with which to carry on their wars; worked with profit amid the ignorance and superstition of the middle ages; after the lapse of so many centuries these mines are not yet abandoned, but still hold an important position among the mining districts of the Old World.

The Hartz mines have been worked since the tenth century, and at the present time a very considerable population is dependent upon them for support.

The Saxon mines were discovered about the same time as those of the Hartz, and it is estimated that they have since yielded the immense sum of two hundred and fifty million dollars in silver. Even at the present time there are no less than one hundred and thirty mines of silver, lead and cobalt in the neighborhood of Freiberg, and eight thousand miners find employment in working them. And while these Freiberg veins are narrow as compared with the Comstock lode, while they have shown rich ore at different levels, yet on the whole they have improved with an increase in depth, and have continued to yield true silver ores throughout their whole extent.

In France, the mines of Huelgoet and Poullaouen have been worked upwards of three centuries. The ancient silver mines of Sardinia have been abandoned, but there are eleven lead mines in operation, and the castaway ores left by the Romans are now being smelted with success. The Hungarian mines were worked in the seventh century; those of Bohemia during the tenth century, and the mines of the Tyrol two centuries later. The mines of Felsobanga and Schemnitz, in Hungary, fill fissures of great length and breadth, and have had at different depths concentrated bodies of rich ore. So deep as they have been worked, these mines have been found to be highly metalliferous and, while the character of the ore has not been so rich below as in the upper levels, yet this deterioration has been more than compensated by an increase in the amount obtained.

The mines of Konigsberg in Norway were known before the discovery of America; and it is a remarkable fact, that though the mines are narrow and rich, and pocket after pocket has been from time to time discovered and exhausted, yet these mines have been latterly more productive than ever before, and still yield a great amount of revenue to their owners. The old mine of Sala, in Westmania, more than five hundred years ago, and is still worked by a Swedish company, who pay the government one tenth of all the silver produced.

The bullion product of Great Britain has been small as compared with that of other European countries. The amount produced by Russia has been very uniform since the beginning of the present century. During the year eighteen hundred, the silver product was about sixty thousand pounds, and at present it is the same.

With the exception of those in the United States, the American mines are all of ancient date. Those of Cerro de Potosi, in Bolivia, were discovered three hundred and thirty-five years ago; and during a period of two hundred years, from the time of the conquest to that of emancipation, have yielded one billion two hundred million dollars. There are famous mines on the highest summits of the Andes, and these mountains to their lowest depths contain silver. Many of these mines, which were worked with so much industry in olden times, have been abandoned consequent upon the influx of water, the depth of the works, and the frequency of domestic conflicts. The impoverishment of the ores as depth has been obtained, has sometimes been given as the cause of their abandonment; but such has rarely been the case.

The Cerro de Pasco mines were known about a century later, situated on an elevated table land of the Andes, at an altitude of over fourteen thousand feet above sea level. They have yielded up to the present time more than one billion dollars in silver. Some of them were inundated and abandoned, and although they do not present the animation of the past, still they continue to be worked at present. The English having gone there with their apparatus and machines, have restored many of the

mines to their former prosperity. These veins exhibit in depth the same richness as near the surface. At the present time, the annual product of these mines, with the Cerro de Potosi, is six hundred and fifty thousand pounds.

The mines which are nearest those of Nevada in character are those of Mexico. They, too, are old like those of South America and Europe. The Tascan mines were in successful operation not long after the invasion by Cortez. The mines of Guanaxuato, Guadalajara, and Zacatecas are but a few years younger than those of Potosi. The celebrated mines of Valencia, Pachuca, Real del oro, Real del Monte and others, have yielded thousands of millions of dollars. In former times, these mines stood alone in the extent of their veins and the abundance of their ores, and only in later years have they been equaled by the discovery of the Comstock. So productive have they been from the surface to the lowest levels, that even with the primitive appliances for working the ores, they have added to the world's stock of silver more than three billion of dollars. The Veta Grande at Zacatecas, and the Veta Madre at Guanaxuato, have structures like the Comstock lode. They are two of the largest silver bearing veins in the world, and can be traced over an extent of twelve miles. They are from twenty-five to sixty feet in width, and are bounded by porphyry, limestone, and schists. The Veta Grande, in two hundred years after its discovery, had yielded about six hundred and sixty-six million dollars.

The Valencia mine on the Veta Madre (mother vein) of Guanaxuato was opened about a century ago on a part of the vein which had been worked and abandoned two centuries before. A rich body of ore was found at a depth of two hundred and forty feet, and from seventeen hundred and sixty-eight to eighteen hundred and ten, the yearly product averages about one million and one-half dollars. This rich ore was found to extend to the depth of twelve hundred feet, below which it was at that time too poor for extending. The mine was allowed to fill up with water, but of late years it has been drained, and is now yielding largely from the immense quantities of low-grade ores. In both these mines the richest ore was found in the upper levels, but in depth the quantity obtained was much greater.

The history of all these European and American mines has been the same. They were discovered early; they have had their times of depression and times of extraordinary production; they have had their bonanzas and their barren levels; they have been abandoned at one time, and energetically worked at another, but throughout all the ages they have continued to be productive to the present time, and without doubt will still continue to play an important part in the mining industries of the world in the future. One thousand years ago the Austrian miner descended the same shaft which the living descend to-day; for centuries to come, the huge piles of waste rock will grow higher and more rugged on the Saxon plains. Empires have risen and fallen; rulers have passed from history since the mines of Mexico and South America began to be worked; twenty centuries have not exhausted the mineral wealth of Spain. Reasoning from these facts, it is safe to conclude that the mines of Nevada are far from being worked out. When the character of our mines is compared with those of other countries, the product is found to be small, and considering the extent of territory as yet undeveloped, the amount of prospecting done has not been great. But when a larger population shall have permanently settled here; when men shall be satisfied with smaller gains, and capital shall be more interested in the work,

then grander and more remunerative results may be expected than any which have yet been obtained. The new level recently opened by the Sutro Tunnel insures the working of the Comstock lode for an indefinite period in the future, and this lode will only cease to be productive when the genius of men fails to invent new devices for sinking to greater depths.

LAKES AND RIVERS.

The principal lakes are Tahoe, Pyramid, Walker, Carson, Washoe, and Humboldt. Tahoe has an elevation above the sea level of about six thousand feet. It is about fifteen hundred feet in depth. It is situated in the Sierra Nevada Mountains, fourteen miles from Carson City. The western line of the State divides it about the center. The water is very clear and cool, and remarkable for its specific lightness. The bodies of persons drowned in Lake Tahoe never rise to the surface. It is twenty-two miles in length by fourteen in width.

Pyramid Lake is thirty-five miles long and from ten to fifteen in width. Its elevation above sea level is about four thousand feet. It is situated in the southwestern portion of Humboldt County. It is surrounded by mountains which rise to the height of about three thousand feet. It has been sounded and found in places thirty-six hundred feet deep. It gets its name from a rock which rises six hundred feet above the surface of the water in the shape of a pyramid. There is an island near the eastern side which contains about six hundred acres of land, upon which rattle snakes and wild goats abound. It has no outlet, and is fed by the Truckee River and other mountain streams.

Washoe Lake is situated in Washoe County. Its waters are shallow and alkaline. It covers about six square miles. It is surrounded by mountains; on the west are the Sierras, from which it is chiefly fed by numerous small streams which flow out into the valley sink, and then rise again in the lake.

Walker Lake is about twenty-five miles long and ten miles in width. Its area has been considerably increased of late years, so that the old stage road, formerly about five miles from its shores, is now under water. It is situated in Mason Valley, Esmeralda County. Its elevation above sea level is about four thousand feet, and its waters are fresh and clear.

Humboldt Lake, more commonly called the Sink of Humboldt, is twenty miles in length and ten miles in width. Its waters are brackish, and strongly impregnated with salt and soda. It is situated near the line between Humboldt and Churchill Counties, and has an altitude above sea level of four thousand one hundred feet. It is about the lowest point in the Great Basin. The waters from the east and west meet here.

The Carson Lakes are situated near the center of Churchill County. They are about twenty miles apart, and spread out over a vast area of low ground, so that their dimensions vary greatly in proportion to the dryness of the season, and the amount of the snow-fall on the Sierras. In wet seasons they are connected by a slough with Humboldt Lake; and the waters, like that of the latter lake, are impure, and contain a large per cent. of alkali and salt.

With the exception of the Colorado, none of the rivers of Nevada are navigable. The Colorado forms the southern boundary of the State. Its average width is one half mile. The average current at ordinary low stages, where no contraction or special obstruction exists, is about three

and one-half miles per hour. When it passes over rapids and through narrow cañons, the current is more than twice as rapid, so that it is difficult for steamboats to stem it.

The Truckee River forms an outlet for Lake Tahoe to empty its waters into Pyramid Lake. Two thirds of its entire course is in Washoe County. It affords many excellent sites for mills, but its waters are chiefly used in irrigating the fertile lands of Washoe County. During the past few years many ditches have been constructed for irrigating purposes, and still there is a large supply of water left.

The Carson River heads in the Sierra Nevada Mountains and flows through Douglas, Ormsby and Lyon Counties. Although not so large as the Eureka, its waters have been made much more useful. Numerous large quartz mills have been erected on its banks which are run by water power. It irrigates thousands of acres of fertile lands, and also furnishes the means for the transportation of thousands of cords of wood from the mountains to the markets.

The Walker River also has its source in the Sierras; it flows through Esmeralda County, and empties its waters into Walker Lake. It is only used for irrigation, being situated too far away from the mines to be made available for milling purposes.

The Humboldt River flows from the east. It has its source in Utah, and, after winding through a succession of mountains for a distance of about three hundred miles, it empties its waters into Humboldt Lake.

The Owyhee River has its source in the mountains which surround Independence Valley. It flows north into the Snake and Columbia Rivers, and finally empties its waters into the Pacific. It is the only river which rises within the borders of the State that has an outlet to the ocean. Reese River heads in the mountains to the south east of Ione. It flows north, and sinks before reaching the Humboldt.

In all of these lakes and streams are found several varieties of food fish, chiefly different species of trout. In all of the mountain streams and in the headwaters of the rivers already described brook trout abound, while in the lakes and those streams which empty into them are found silver trout. In Lake Tahoe a very large variety of trout is found, some of which have been caught which weighed thirty pounds each. In the Owyhee River are found salmon and salmon trout. Through the efforts of the Fish Commissioner appointed at the last session of the Legislature, Carson, Walker and Humboldt Lakes and the Truckee River have been stocked with Schuylkill catfish and Sacramento perch. A fish hatchery has been established in Carson, and two hundred thousand McCloud River salmon are ready for distribution in the different lakes and streams in the State.

In the eastern counties considerable game is found, as prairie chickens, grouse and quail. In the mountains and upland valleys are often seen mountain sheep and antelope. The otter and beaver are sometimes found.

CLIMATE.

The climate of Nevada, owing to the diversities of surface, variations of altitude, and other causes, irrespective of the differences of latitude, varies greatly in certain localities. The changes of the season are very irregular, and pass into each other without notice. Generally, the extremes of temperature are not great. Within the Great Basin, during

the summer months, the thermometer seldom rises above ninety-five degrees, Fahrenheit, nor does it often fall below zero in winter, except upon the mountains and in the most elevated and exposed valleys. At Carson City, where the altitude above sea-level is four thousand six hundred and thirty feet, the annual mean temperature is about fifty-two degrees; the annual maximum sixty-eight degrees, and the annual minimum thirty-four degrees. At this point, heavy winds from the southwest prevail. During the year 1876, there were three hundred and sixteen windy days, two hundred and seventeen cloudy, and forty-nine rainy. The fall of rain and snow for the same year was seventeen and seventy-three hundredths inches. The nights are always cool in summer in all parts of the State; this marked peculiarity of climate is due to the cooling effects of the many ranges of snow covered mountains. The atmosphere is exceedingly dry. There are never any fogs. The moisture of the clouds is condensed on the mountain tops, so that the fall of rain in the valleys is very limited. The carcasses of dead animals dry up with but little offensive putrefaction, leaving the bones and hides mummified. In the eastern portion of the State, cloud-bursts are of frequent occurrence, from about the first of July until the middle of September. The climate is healthful. No country in the world is more free from infectious diseases. Epidemics are never known. Earthquake shocks are sometimes felt, but rarely severe enough to do any damage.

STOCK RAISING AND AGRICULTURE.

The soil of the State is generally a loam, most fertile where the underlying rock is limestone, but nearly everywhere sufficiently so to reward the labors of the husbandman, where water can be obtained for the purposes of irrigation. The immense stretches of barren wastes so often seen are only so, because of the want of moistening showers of rain, and streams sufficiently numerous to supply the demands for agriculture. As a large proportion of the land is much better adapted to grazing than to tillage, much attention has been given to the raising of live stock, and the horses, cattle, sheep, and goats bred here are of excellent quality. The winter feed, consisting of bunch grass and white sage, furnishes the best of sustenance for stock, so that, with rare exceptions, is any provision made or stores of fodder laid up for winter use. During the summer months the pasturage in the vicinity of springs, brooks, and creeks on mountain sides and in the cañons supplies the feed, but when winter comes, the herds and flocks feed miles away from water in the valleys. The northern and eastern sections of the State are the best adapted for grazing. Many of the loftiest mountains are covered with a species of bunch grass peculiar to those localities. The table lands and dry valleys in many places are covered with the white sage which makes the best of winter feed for stock. When growing in the spring and summer, this sage is bitter and not eaten, but when the frosts of fall and winter come it is tender, sweet, and nutritious, and better liked by stock than other kinds of feed. So extensive has the business of stock raising become that now the supply far exceeds the wants of the population, and thousands of head of beef cattle are yearly shipped by railroad to the markets of California. The agricultural lands of the State are small in proportion to the area, though in all of the valleys where are found streams of water large tracts of land are brought under cultivation, and the crops

produced are very superior in character. The best of these arable lands are found in Carson, Eagle, Mason, Washoe, Truckee, Humboldt, Reese River, Owyhee, Tamoille, Ruby, Steptoe, Spring, White River, Snake, Panaca, Pahrnegat, Paradise, Muddy, and Los Vegas valleys. There are hundreds of other smaller valleys, and in many of them the soil is quite as productive, though less water is found; and there is no land in the State but what is benefited, for agriculture, by irrigation. In the northern and central valleys all the grains, vegetable, and fruits of a temperate climate are cultivated with success. In the southern valleys, the proportion of fertile land is much less than in other sections of the State, except about springs and streams of water. The country is chiefly a desert. The scarcity of water is a noticeable feature, but where there is sufficient for irrigation, as in the Muddy and Los Vegas valleys, the farmer is abundantly rewarded for his labor. Fruit trees, embracing nearly every variety known in both temperate and tropical climates, are cultivated. Growing here side by side are seen the olive and the plum, orange and apple, lemon and peach, fig and apricot, pomegranate and pear, and the walnut and pepper. Grapes also grow to perfection. The vineyards produce as perfectly ripened and delicious grapes as the most favored localities in California and France. Cotton and sorghum have been cultivated quite extensively; one acre of land yielding as much as a thousand pounds of the former. Melons, squashes, and beans also grow abundantly as well as corn, and all the smaller grains. Some of the hardier vegetables, as potatoes, do not thrive so well. Two crops are raised yearly on the same land. It is first sown in small grains, as wheat, barley, rye and oats, which are harvested about the first of June. It is then planted in corn, beans, potatoes, beets, cabbage, onions, squashes, melons, and all other varieties of garden vegetables. The mesquit bushes, which grow in some of these southern valleys, furnish a very nutritious bean, which all animals feed upon as soon as the grasses die in the fall. Stock keep as fat upon this feed during the winter months as though fed upon hay and grain.

STATE GOVERNMENT.

Nevada is governed under a constitution which was adopted by a vote of the people on the first Wednesday in September, eighteen hundred and sixty-four. In accordance with the requirements of the enabling Act of Congress, approved March twenty-first, A. D. eighteen hundred and sixty-four, the following irrevocable ordinance was prescribed: First—That there shall be in this State neither slavery nor involuntary servitude, otherwise than in the punishment for crimes whereof the party shall have been duly convicted. Second—That perfect toleration of religious sentiment shall be secured, and no inhabitant of said State shall ever be molested in person or property on account of his or her mode of religious worship. Third—That the people inhabiting said Territory do agree and declare that they forever disclaim all right and title to the unappropriated public lands lying within said Territory, and that the same shall be and remain at the sole and entire disposition of the United States; and that lands belonging to citizens of the United States residing without the said State shall never be taxed higher than the land belonging to residents thereof; and that no taxes shall be imposed by said State on lands or property therein belonging to or which may hereafter be purchased by the United States. Every male citizen of the United States, twenty-one

years of age and having resided in the State six months and in the county thirty days next preceding an election is entitled to vote and hold office. The general election is held on the Tuesday after the first Monday in November, biennially. The powers of the State Government are divided into three separate departments, and no one chosen to office in either department shall exercise any functions belonging to either of the others. The Governor is elected for a term of four years by the people at large. He must be a qualified elector of the age of twenty-five years, and a resident of the State for ten years next preceding the election. He receives a salary of six thousand dollars per annum, and is allowed a private secretary at a salary of twenty-four hundred dollars per annum. The Lieutenant-Governor is elected for the same term, and must possess the same qualifications. He is *ex officio* President of the Senate, and during its session receives ten dollars per day in addition to his annual salary of thirty-six hundred dollars. The salaries of the Administration officers are as follows: Secretary of State, Treasurer, Controller, Surveyor-General, Attorney-General, each thirty-six hundred dollars, and Superintendent of Public Instruction twenty-five hundred dollars. The four first named have deputies whose salaries are each three thousand dollars. The Legislature consists of a Senate of twenty-five members and a House of Representatives of fifty members. The Senators are elected for four years, and the Representatives for two years. The sessions are biennial, and begin on the first Monday of January next after the election of members. The pay of members is ten dollars per day for sixty days. The Judiciary consists of a Supreme Court, District Courts, and Justices' Courts. The Supreme Court consists of a Chief and two Associate Justices, with a clerk; the salary of each of the Judges is seven thousand dollars, and the term of office is six years. There are nine judicial districts; the salaries of the Judges vary from three thousand dollars to seven thousand three hundred dollars. All the Judges are elected by the people. The public revenue is chiefly derived from the taxation of all property—real, personal and possessory, excepting mines and mining claims, the net proceeds of which alone are taxed.

The population of the State in eighteen hundred and seventy was forty-two thousand four hundred and ninety-one; according to the census taken by the State in eighteen hundred and seventy-five it was then fifty-two thousand five hundred and forty.

CHURCHILL COUNTY.

The entire western half of this county, except near the waters of the Carson River, is sandy and barren. The central and eastern portions are mountainous, and the ranges, like those in other parts of the State, have a northerly and southerly trend. This county forms the central basin of Nevada. Nearly in the center is the sink of the Carson River, where the waters spread over a large surface of land. To the north is the sink of the Humboldt, which drains the central portion of the State from the east; and near the northwestern corner is Pyramid Lake, into which flows the water of the Truckee. On the mountain sides and plateaus there is an excellent growth of bunch grass, which, with the white sage of the valleys, furnish an abundance of feed for cattle and other kinds of stock. There is little good agricultural land in this county in proportion to the area. Along the banks of the Carson River, and in other localities where water can be obtained in sufficient quantities for irrigation, agriculture is carried on with great profit, and the quality of the productions are not surpassed in any other section of the State. Great success has been had here in the cultivation of fruit trees. The apple and peach orchards along the lower Carson bear abundantly, and are seldom injured by frosts which are so destructive in other sections of the State.

There are no productive silver mines in Churchill County. Formerly there was a great deal of prospecting done, but as the pockets of ore found were of limited extent, no satisfactory results were ever obtained. The salt, soda and borax deposits are among the most extensive in the world; and when there is a better market for these products, the revenue of this county will be largely increased. The assessed value of real estate for the year eighteen hundred and seventy-eight was eighty-three thousand three hundred and thirty-six dollars; and the value of personal property was three hundred and sixty-one thousand two hundred and forty-four dollars, making a total value of taxable property of four hundred and forty-four thousand five hundred and eighty dollars. There has been considerable increase in the population during the last two years. The number of votes polled at the last general election was one hundred and twenty-eight.

DOUGLAS COUNTY.

This county is bounded by California on the west and south, Esmeralda County on the east and Lyon and Ormsby Counties on the north. Its resources are chiefly agricultural. Carson valley, which lies between the Sierra Nevada and Pine Nut ranges of mountains, contains some of the most fertile land in the State. The Carson River, which flows through the center of the county, and numerous brooks from the surrounding mountains, furnish a good supply of water for irrigation. There are a large number of well cultivated ranches in this county. The extensive farm belonging to Mr. Dangberg is one of the best improved and most productive in the State. Thousands of tons of hay are produced here every year, and the grain, fruit and vegetables are of superior qualities. Stock raising also is carried on here very extensively, the native grasses furnishing excellent pasturage. The wood trade, too, is important. The extensive forests of the Sierra Nevadas furnish the necessary wood and timbers for mining purposes on the Comstock, and a number of expensive flumes transport it from the mountains to the Carson River; thence it is floated to Empire and other points convenient to the Virginia and Truckee Railroad.

Although a number of mining districts have been organized in this county at different times, and a great many claims have been located, on which a great deal of money has been expended, still the results have not been encouraging. Most of these mining claims have now been abandoned, and but little work has been done on any of them during the past two years.

A number of hot springs are found here, some of which are remarkable for the medicinal qualities of their waters. Genoa is the principal town, and contains some very good public and private buildings. It is the county seat, and is situated at the base of the Sierras, in Carson valley. The value of real estate for the year eighteen hundred and seventy-eight was five hundred and forty thousand four hundred and forty-three dollars; and that of personal property was three hundred and seventy-six thousand five hundred and one dollars. The number of votes cast at the last general election was four hundred and eighty-nine.

ELKO COUNTY.

No county in the State has shown a greater proportionate advance in population and wealth during the past two years than has Elko. Capitalists have become more interested in the prosecution of new enterprises and work, and the rich discoveries at Tuscarora and other mining districts, north of the railroad, have caused a steady immigration to this county. Elko occupies the extreme north-eastern portion of the State. The general surface of the county is a plateau, intersected in a northerly and southerly direction by numerous hills and mountains. Between these mountain ridges are valleys of great extent and fertility. The climate is of the most healthful, though more severe in winter than in other sections of the State. Along the Humboldt river and its tributaries, the Owyhee and the streams which flow into the Snake river, agriculture is carried on with continued success, and the products are seldom surpassed in character. Independence, Ruby, Pine, Lamoile and other valleys have a soil fertile by nature and which by cultivation becomes exceedingly productive, so that the farmer for his toil is rewarded with abundant crops. Substantial buildings and farm improvements have been made. During the year eighteen hundred and seventy-eight the area of the land cultivated was eleven thousand three hundred and thirty-seven acres, and that of the inclosed land twenty-thousand acres. During the same period there were produced sixty-five thousand nine hundred and ten bushels of wheat and oats, one hundred and fifty-four thousand two hundred bushels of barley, and one hundred ninety-seven thousand four hundred and fifty bushels of potatoes, and a large amount of other grains and vegetables. Stock raising is carried on quite extensively, and adds largely to the resources of the county. The hills and valleys furnish an unlimited supply of nutritious grasses and white sage, the latter affording excellent feed for stock. Fish are found in all the streams, and a great variety of game abounds.

The mineral resources of the county are just beginning to give profitable returns, and as yet, except in a few districts, the developments made are scarcely worthy of mention. There is a large field here for the profitable investment of capital, and a rich harvest in store for the judicious employment of labor. Almost every mineral found in other parts of the State is found in Elko. The mica in the Ruby Range, the placers of the north, the lead, copper, and silver of nearly every district need only a little well directed energy to produce profitable results. The silver production during the past two years has been greater than ever before, and gives promise for much better returns in the future. The value of the yield for 1877 was one million seventy-five thousand nine hundred and sixty-nine dollars, being an increase over the preceding year of five hundred and ninety-nine thousand seven hundred and twenty

dollars. There has also been a large increase in the population of the county. The number of votes polled at the last election was eighteen hundred and sixty-six, or two hundred and ninety-six more than were polled two years before. The assessed value of real estate for the year eighteen hundred and seventy-eight was one million eight hundred and forty-five thousand and four hundred and twenty dollars, and of personal property, one million two hundred and ten thousand and one hundred and seven dollars, making a total of three million fifty-five thousand and five hundred and twenty-seven dollars.

TUSCARORA DISTRICT.

Since my last report, the developments made in this district, and its extraordinary yield of bullion for the year 1877, have placed it in the front rank of the mining districts of eastern Nevada. In no district in the State have improvements been made more rapidly. During the summer of 1876 there were scarcely fifty men in this district; now there are not less than three thousand. There were no hoisting works on any of the claims except the windlass, rope and bucket. Now there are nearly a dozen steam hoisting works; and some of the shafts have reached a depth of nearly five hundred feet.

Tuscarora District is situated about fifty miles north from Carlin, the nearest point on the Central Pacific Railroad. It is on the west side of Independence Valley, in the low hills which slope out into the valley. The Owyhee River has its source near by, the waters of which flow into the Pacific Ocean. This district was organized in July, 1867, for both placer and quartz mining; but for a long time no work was done, except on the placer mines. Two water ditches were constructed, which afforded a limited supply for sluicing. Most of the claims were leased to Chinamen, who produced during several years a considerable amount of gold dust. The geological formation is porphyry. The veins are well-defined, having in general a course of north-east by south-west, and dipping at an angle of from fifty to sixty degrees to the north-west. The water level is reached at the depth of about one hundred feet. The water from the mines furnishes the supply for the hoisting and reduction works. Wood is scarce; the immense fields of sage brush in Independence Valley furnish the principal fuel for all purposes. Quite a trade is carried on here in sage brush. Some of the ranches in the neighboring valley are very valuable on account of this product. Game, such as prairie chickens, grouse, sage hens and rabbits are found here in great abundance; and in the Owyhee River there are plenty of trout, salmon and salmon trout, besides other kinds of fish. Good roads connect this district with Elko, Carlin and Battle Mountain, and daily lines of stages run to Battle Mountain and Elko.

tinues to increase in size and quality to the Argenta line, a distance of eighty feet, where, at the bottom of the drift it is nearly three feet in width. At this point the two companies have combined in the sinking a joint winze, which yesterday forenoon, when the reporter visited the mine, had been sunk about twelve feet.

The object of this report is merely to give a simple statement of the facts; otherwise the writer would be tempted to enthuse a little over the showing made in the winze at the trifling depth already attained, but he will resist the temptation, and confine himself to a plain recital of his observations. The pitch of the foot wall in the winze is fifty-seven degrees, while that of the hanging wall is about forty-five. Both are as smooth and well defined as the walls of a house. The difference in the pitch has, in the distance sunk, increased the width of the ledge from three to ten feet, and as the walls continue to run at the same angle the entire distance, the indications point almost positively to a corresponding widening of the lode for a considerable distance below. The ore is mostly sulphuret with a little ruby intermixed, and scarcely any quartz. We believe it to be a moderate estimate, and considerably below the actual result, that the entire ledge at that point will mill two hundred and fifty dollars per ton. The lode dips to the north-west, and the ore chimney directly to the west. The distance from the old shaft to the winze, on the boundaries of the two claims, is three hundred and eighty feet, and if the chimney continues at its present dip, its western boundary cannot be more than one hundred and thirty feet from the shaft at the four hundred level. The east drift from that level has already been extended one hundred and fifteen feet, and the ore body is liable to be struck within the next two or three days. It may be regarded as certain as anything pertaining to prospective mining matters can possibly be, that this will prove by far the greatest and most important discovery ever made in the Grand Prize. If the chimney proves to be what present developments indicate, when the ground is properly prepared for stoping, three men will be able to take out ore enough to keep the company's twenty stamps running without cessation. Nothing is being done in the works west of the shaft at the three hundred and twenty level. The party did not visit the four hundred, it being too wet there yesterday to prosecute their explorations with any degree of comfort. Mr. Dixon, however, informed the reporter that the winze in the west drift had been sunk to the depth of twenty-four feet, and at the bottom there was a solid ledge three feet in width, of two hundred dollar ore.

INDEPENDENCE.

This mine was originally located as the Young America North, and has fifteen hundred feet on the vein. During the past year nearly three thousand tons of ore from this mine have been worked at the Grand Prize and Independence Mills, the bullion yield from which was one hundred and seventy-eight thousand six hundred and fifty-one dollars and fifty-seven cents. The total dividends declared have been seventy-five thousand dollars. The assessments levied amounted to fifty-five thousand dollars. This company owns, in connection with the Navajo Company, a ten-stamp mill, with a White's roasting furnace. A double compartment shaft has been sunk over two hundred feet, over which has been erected substantial steam hoisting works. The cost to this company of the mill

and furnace was thirty-one thousand dollars and of the hoisting works ten thousand dollars. Four shafts have been sunk at different points on this company's mine. At a depth of one hundred feet in No. 1 shaft a level has been run to the southern boundary line of the claim, and one north a distance of one hundred and forty feet. About five hundred feet north of shaft No. 1, another shaft has been sunk one hundred and seventy-five feet.

This shaft is well timbered from top to bottom.

Shafts Nos. 3 and 4 are only prospecting shafts which were sunk with a windlass. There is a great amount of ore in sight in this mine which yields at the mill fifty dollars per ton. The vein is from four to eight feet in width.

NAVAJO.

This is one of the most westerly locations in the district, and next to the Grand Prize, has been worked more extensively than any other mine in the district. A double compartment shaft has been sunk a depth of three hundred and seventy-five feet. A station has been cut out at the three hundred and fifty-foot level. The vein varies in width from six inches to three and a half feet.

Drifting on the vein has been done from different levels, and a considerable quantity of ore has been extracted. During the past year the yield from this mine was one hundred and eighty-seven thousand four hundred and ninety-eight dollars. The total assessments levied have been one hundred and twenty-five thousand dollars. Steam hoisting works with pumps have been erected and the mine has been opened up in a very systematic manner. The company own one half of the Independence mill; also comfortable residences for the employees, shops and out-houses, and everything necessary for the working of the mine.

ARGENTA.

This mine is located to the east of and joins the Grand Prize in the same vein. A vertical double compartment shaft has been sunk to a depth of about four hundred feet. Steam hoisting works have been erected, stations have been cut out at different levels, and a large amount of drifting has been done. This mine has been incorporated, and is listed on the San Francisco Stock Board. Assessments to the amount of fifty thousand dollars have been levied. A good body of ore has been found on the line between this mine and the Grand Prize, average assays from which show it to be worth one hundred and ninety dollars per ton.

There are a number of other incorporated companies at work in this district, as the De Frees, Young America, Belle Isle, Hornet and East Grand Prize. The prospects for finding valuable bodies of ore in the mines of some of these companies are very encouraging.

Since the foregoing report was written, the following description of an important development in the Grand Prize Mine was published in the *Tuscarora Times-Review*, of December 31, 1878:

"We mentioned several days ago that the ledge had been struck in the crosscut at the five hundred level of the Grand Prize. At that time the blast which penetrated the hanging wall made an outlet for the im-

mense body of water confined within the encasements of the lode, and the flow was so great that the drift was flooded before the extent or character of the ledge at that point could be ascertained, further than could be estimated from a number of rich pieces of ore thrown out by the blast. The water raised to a considerable height in the shaft, and before it could be lowered, an accident occurred to the main pump which further delayed operations, and until last Sunday afternoon the mine was not sufficiently drained to enable the prosecution of work in the face of the drift. Even at that time the water flow was so great that but little progress was made for nearly twenty-four hours, and even now the work is prosecuted with considerable difficulty, there being fully thirty inches of water flowing from the ledge into the crosscut. Sufficient has been done, however, to develop the richest, and probably the largest, body of ore that was ever discovered in this celebrated mine. A representative of the *Times-Review*, by invitation of Superintendent Dixon, visited the new discovery yesterday afternoon, and was convinced by ocular evidence that the glowing reports of the extent and richness of the find, which were current on the streets, were more than verified by the facts. The east side of the crosscut, at the time of the reporter's visit, was in the ledge fully two, and the west side about three feet, with no indications of a foot wall in any portion of the face. The entire ledge, so far as exposed, is composed of high grade ore, while a large proportion of it is of a quality superior to anything ever before discovered in the mine. About twenty pieces, varying from the size of a man's fist to the dimensions of a gallon measure, which were brought to the top, would probably assay upon the average, at a moderate estimate, three thousand dollars per ton. Some of them were almost pure ruby, and resembled chunks of cinnabar more than silver-bearing ore. The reporter noticed but very little waste rock, and is confident that the entire ledge matter that had been taken out at the time of his visit would mill at least six hundred dollars per ton. The hanging wall is as well defined as at any point on the ledge in the levels above—a clay seam of uniform thickness separating the porphyry from the ledge matter. The width of the ledge at that point has not been ascertained, but the developments already made indicate the most important discovery ever yet made in the district; and the finding of such a body of ore at the greatest depth yet attained, cannot but prove decidedly encouraging, not only to the stockholders of the Grand Prize, but also to those interested in other mines in the district, and especially those in the vicinity of the newly-discovered bonanza."

CORNUCOPIA DISTRICT.

Work has been vigorously prosecuted in a number of the mines in this district during the past two years. Steam hoisting works have been erected on the Hussey and on the Panther Mines. Although the rich bodies of ore which were found in the Leopard Mine have been exhausted, a great amount of dead work has been done in prospecting for other deposits. The bullion yield of this mine was one million one hundred and thirty-nine thousand nine hundred and fifty-one dollars and fifty-seven cents. Total dividends paid, one hundred and sixty-two thousand

five hundred dollars. The shaft of the Hussey Company has reached a depth of five hundred feet. This mine joins the Leopard on the north. The Panther shaft has been sunk to a depth of three hundred and sixty feet; from this point drifts have been run on the vein both east and west. Some work has been done on other locations in this district. The bullion yield from this district for the year 1877 was one hundred and thirty-three thousand nine hundred and seventy-three dollars and thirty-nine cents, which shows a large falling off from preceding years. Recent explorations are encouraging, and the prospects are good for an increased shipment of bullion in the future.

RAILROAD DISTRICT.

This district, which is situated about twenty-five miles in a south-westerly direction from Elko, has shown some activity during the past two years. From a letter written by Mr. E. G. Nason, dated at Bullion, November 10, the following information concerning the mines of this district is taken. The mines of this district are confined to a mineral belt running north and south, with an average depth of ten miles. This belt has been traced, and mines located nearly five miles. The country rock is composed of granite, quartzite, spar, lime-stone and slate. The silver ores are high grade, and are in the form of carbonates and galena. From what I have seen of the mines, I believe them to be as valuable in copper and silver as any in eastern Nevada.

In the years eighteen hundred and seventy-one and eighteen hundred and seventy-two, the Empire Mining Company of New York was organized, and commenced work on the north side of Bunker Hill. Of course, as is usual in such cases, none but a scientific man from Freiburg could wrench the untold millions of precious metals which lay hidden within the rock-bound breast of old Bunker Hill to light; but after doing a large amount of useless work, and expending thousands of dollars without any remuneration, they, like all eastern capitalists who do not understand their business, refused to advance further means to be applied to developments; hence, from that time to the present writing nothing more has been done. But few mines are now worked, and the miners are holding on; and well they may, for the time is not far distant when these mines will command good figures. At the Blue Bell mine, I found ten men at work, and about two hundred tons of copper ore piled up on the dump. This mine is worked by men residing at Elko. A small furnace for the reduction of copper ore is connected with the mine. The Sweepstakes is owned by Charles A. Brossimer, and is one of the oldest claims in the district. It is developed by two shafts. This mine carries the richest copper I have seen in the camp. The Lion, owned by H. A. Soulé, is another fine piece of mining property, developed by an incline shaft seventy feet in depth; also, a tunnel one hundred feet in length. The ores of this mine are high grade galena. Several tons of ore from the Sweepstakes mine worked here a short time since gave thirty per cent. copper, while assays from the slag gave nearly the same. So much for bad working, but ruin to the pockets of the owners. Good mines can be bought for a few hundred dollars each, which would pay largely for the amount of money invested. What they want here is capital to buy and smelt the ores of the district.

ESMERALDA COUNTY.

In the variety of mineral productions Esmeralda is not excelled in the State; in the extent and value of the same Storey and Eureka only rank higher. While during the last two years the Northern Belle has continued to be one of the most productive mines in the State, and has furnished the greater part of the bullion produced in this county, yet the recent valuable discoveries in the Bodie Mining District of California, from their proximity to Esmeralda, have infused new life into the mining interests of the latter, and the various mountain sides have again been searched by an army of prospectors for their stores of yet hidden ore.

Eight years ago mining operations were so little carried on, that the inhabitants of the county turned their attention to stock-raising as a more profitable field for the investment of their capital and labor, and the profits were so great that grazing ever since has furnished no inconsiderable part of the revenue of the county.

Along the different branches of Walker River, in Fisk, Lake, Mason and other valleys, there are more or less tillable lands, while elsewhere, where the soil is not rendered barren by alkali deposits, there is an excellent growth of nutritious grass. There is game upon the mountains, and fish in the streams, especially is the latter statement true of Walker Lake, the receptacle of the waters of the varying rivers and creeks, a lake from forty to fifty miles in length and of various width, and sheltered from the winds by Mount Corey and its spurs. While large tracts of land in the eastern portion are alkali flats, and, as such, unfit for cultivation or life; yet in 1878 the number of acres inclosed was nine thousand five hundred, an increase of seventeen hundred over the amount of the preceding year. The number of acres cultivated at the same time was four thousand six hundred. The approximate area of the timbered land was five hundred thousand acres, that of the mineral land six hundred thousand, while that of the grazing land was eight hundred thousand acres. The borax fields of Esmeralda are probably the most extensive in the world. Teel's Marsh, twenty-three miles westerly from Columbus; Rhodes' Marsh, fourteen miles in a northerly direction, and Columbus Marsh, five miles south of Columbus, and other less important deposits elsewhere have an almost exhaustless supply, and it is to be regretted, that where the amount is so great a more advantageous market is not close at hand.

The borax returns for the year ending with December, 1877, were five hundred and eighty-eight tons, with a gross value of fifty-six thousand eight hundred and seventy-six dollars and sixty-four cents. The salt returns for the County, during the same period, were three hundred and fifty tons, with a gross value of three thousand five hundred dollars. The value of the taxable property has not increased in proportion to the value

of the mines. In the year 1874, the value of the former was, in round numbers, six hundred and twenty-two thousand dollars, while the production of the latter was scarcely three hundred thousand dollars. Two years later the taxable property was rated at seven hundred and sixty-nine thousand dollars, while the production of the mines, during only nine months of the year had increased to one million and thirty-nine thousand dollars.

According to the late assessment-rolls the aggregate value of real property January 1, 1878, was four hundred and sixty-four thousand and ninety-six dollars, while that of the personal property was four hundred and one thousand nine hundred and seventy dollars, making a total amount of taxable property of eight hundred and sixty-six thousand and sixty-six dollars. At the same time the floating debt of the county was seven thousand eight hundred and seventy-nine dollars, and the cash in the county treasury was sixteen thousand four hundred dollars.

The ores produced were in general of lower grade than those of the preceding year, but the gross yield or value was about the same.

From October, 1876, to October, 1877, there were produced in the county thirty-seven thousand three hundred and ninety-two tons of ore, with a gross value of one million six hundred and ninety-one thousand five hundred and forty-two dollars. The net yield or value of the same was five hundred thousand seven hundred dollars, and the total State and county tax amounted to twenty-one thousand six hundred and fifty-one dollars. There were also sixty tons of tailings reported with a value of five hundred and seventy dollars. At the election held on November 5, 1878, nine hundred and ninety-one votes were polled, being an increase of two hundred and forty-nine votes over the number polled two years before.

Of all the counties in the State, Eureka and Elko show a greater gain.

ESMERALDA DISTRICT.

The important developments made in Bodie District within the past two years has encouraged the renewal of explorations in this district. In October, 1877, the Real Del Monte was incorporated with a capital stock of five million dollars and fifty thousand shares, and a new shaft was started on Last Chance Hill for the purpose of thoroughly exploring the different locations in this vicinity. The shaft has three compartments—two for hoisting works and the other for pumps. It has now reached a depth of nearly five hundred feet.

A station has been cut out at the three hundred foot level where a large body of quartz was encountered that yields good assays. The machinery of the hoisting works is of sufficient capacity to sink a depth of fifteen hundred feet. The Real Del Monte is a strong company with plenty of capital, and, with the known energy and experience of the managers, it is very probable that success will crown their efforts to open a good mine again in this district.

MARIETTA DISTRICT.

This district has come into prominence since my last report, and is situated near the stage-road leading from Carson to Belleville, and about fifty miles from the junction with the road leading to Aurora. The Endowment is the chief mine of the district, and is located about three and one-half miles in a northerly direction from the town of Marietta. The rock formation in which the ledge is found is porphyry. The vein matter is decomposed, and carries carbonate of lead, argentiferous galena and iron. By mill process the ore yields from fifty dollars to one hundred and twenty-five dollars in silver. A tunnel has been run in on the vein, a distance of five hundred feet, connecting with a shaft at a depth of two hundred feet. From this tunnel level two winzes have been sunk two hundred feet, at a distance of three hundred feet apart. The pay ore is about five feet in width, though the vein matter is much wider. The five stamp quartz-mill erected at Philadelphia by the State of Nevada for the Centennial Exhibition was removed to this district, and has run very successfully on the ores obtained here. The Endowment is an incorporated company, the stock of which is listed in the San Francisco Stock and Exchange Board. The assessments levied have been fifty thousand dollars, and the yield of bullion eighty-eight thousand seven hundred and sixty-four dollars. The facilities for mining in this district are pretty good. Work is abundant, but water is scarce. No water has yet been encountered in the mine.

COLUMBUS DISTRICT.

This continues to be the principal bullion-producing district in Esmeralda County, though for the past year the shipments have not been so large as formerly. A great amount of work has been done in a number of the mines in this district.

During the year 1877 the gross yield of bullion from the Northern Belle was one million two hundred and seventy thousand seven hundred and fifty-seven dollars and thirty-six cents. No shipments were made during the first quarter of 1878. The yield for the second quarter was ninety-seven thousand seven hundred and fifty-three dollars and sixteen cents. The total bullion yield from this mine has been three million seven hundred and fifty-four thousand and forty-eight dollars and fifty-five cents, and thirty dividends have been paid, aggregating one million five hundred thousand dollars. The Northern Belle was located in 1864, at which time some assessment work was done. It was soon abandoned. It was re-located in 1870, and since that time it has been worked continuously, though not very successfully till 1873, at which time the present Northern Belle Company was incorporated. A twenty stamp mill was built, and soon the yield of bullion began. The prospects of this mine are still good for future success.

The following summary is from the last annual report of the Superintendent to the Board of Directors. At the time of making my last an-

nual report the larger part of the work at the mine was being done through the tenth level tunnel; the only development on the veins below that point being a winze sank to a depth of two hundred and twenty-five feet. A new shaft had been sunk to a depth of two hundred and six feet, machinery erected thereon, and a drift just commenced at a depth of two hundred feet. The drift has since been driven to the lode, a large amount of prospecting done, both upon that level and upon intermediate levels between it and the tenth level, the shaft has been sunk two hundred feet, and a second level commenced two hundred feet below the first, which is now driven out three hundred feet in the direction of the lode. Upon the first level, the foot-wall portion of the lode has been found weak, generally, but two veins having yet been developed that affords stopes, and they not extending through any considerable distance. We have small ore veins, in two drifts, which are now being driven in this part of the mine. These have but recently come into the faces, and are showing improvement as we drive. To the front we have, and are still developing, a strong vein which is opened upon through a distance of one hundred and twenty-five feet, and which we are driving upon in ore in both directions. At its widest part there are twelve feet of pay ore, of fair grade. The vein in one direction in which we are driving, is now presenting three feet of high grade ore; say better than one hundred dollars per ton. In the opposite direction the grade is from fifty to sixty dollars. We are now sinking a winze upon this vein to connect with the shaft of the second level. It is down some thirty feet, with the ore grade improving as we sink. At the point where we commenced sinking the vein is wide, and as yet, we have not taken either the hanging or foot wall. If the conditions continue favorable, as at present, we will connect this winze with the level within the next ninety days. I expect to make other important developments upon this first level before we have done prospecting it. The mills are in excellent condition, and but one (No. 2) at present running. If our front vein continues to develop as favorably as at present, we will at no distant future, have ore enough opened upon to enable us to start up the other.

During the past month our milling has not been successful, the tailings at times carrying away more than one half of the assay value of the ore. I attribute the difficulty in most of it, to the excessively hot and quiet weather which prevailed, and which checked the draft of the furnace to such an extent as to prevent the thorough roasting of the ores. The draft has been improved and the difficulty overcome, as is shown by the work of the past several days. Our contracts for salt and ore hauling have been let at the same figures as for the previous year. For wood and charcoal we have been compelled to submit to an advance, occasioned by the increased distances through which those supplies have to be delivered.

EUREKA COUNTY.

In population and importance Eureka is the second county in the State. The inhabitants number about seven thousand. At the last general election two thousand one hundred and thirty-seven votes were cast for the gubernatorial candidate. The assessed value of taxable property in the county for the year 1878 was, personal property, one million three hundred and eighty-five thousand four hundred and ninety dollars; real estate, one million fifty-seven thousand two hundred and twenty-seven dollars; total value of the assessment-roll for the year, three million one hundred and seventy-nine thousand nine hundred and thirteen dollars, an increase during the last two years of three hundred and fifty thousand two hundred and twenty-three dollars and thirty cents. This estimate does not include the net proceeds of the mines, on which taxes are also assessed. The gross product of silver and gold for the year 1876 was two million one hundred and seven thousand one hundred and fifty dollars and seventy-six cents. For 1877 it was three million eight hundred and ninety-eight thousand eight hundred and seventy-eight dollars and sixty-five cents, and for 1878 it is not far from seven million dollars, which shows an increase since 1876 of nearly five million dollars. There is no tax on lead bullion, and it has been impossible to obtain any definite statistics in regard to the value of this product. It is, however, not far from three million dollars.

The most important business in connection with the mining interests of this county is the manufacture of charcoal, the annual consumption of which is about one million two hundred thousand bushels. The supply of wood for this business in this county is nearly exhausted, and is now obtained from the adjoining counties. The following charcoal statistics are from an estimate published in the *Eureka Sentinel*: There are eight hundred coal burners employed in the trade, ninety per cent. of whom are foreigners, and about fifty per cent. of the latter are American citizens. With a few exceptions, this force is in the employ of less than a dozen firms, two thirds of whom are of foreign birth. The average distance that the coal is hauled by teams is thirty-five miles, ten companies owning the outfits. There has been consumed within the last five years six million bushels of charcoal, and it is estimated that there is timber enough standing within a radius of sixty miles to produce twenty-five million bushels. The regulation standard allows thirty-three bushels of coal to one cord of nut-pine wood; but this is not correct, actual experience proving that it will not produce more than twenty-eight.

It will be seen that there is not quite a million cords of wood in the growth of timber on the hills and mountains, and probably one-third of this is not available. At the present rate of consumption, our supply will be exhausted in eight years, allowing that every stick of growing timber

can be utilized. At the price ruling in Eureka (twenty-five cents per bushel), the article remaining to be marketed in the future has a value of six million dollars.

The agricultural resources of this county are limited, sixty-eight thousand eight hundred and fifty-two acres are taxed as agricultural lands, but of this amount only a small portion is cultivated owing to the scarcity of water for irrigation. Wherever water can be obtained in sufficient quantities for irrigating purposes, every acre of land is utilized in raising hay, grain, and vegetables for the market at Eureka, where all farm products command the very best prices. The mountains and valleys of this county afford good pasturage, and all the grazing ranges are stocked to their full capacity. For the year 1878 the assessment roll shows thirteen thousand three hundred and sixty-five stock cattle, eleven thousand two hundred and thirty-seven sheep, one thousand eight hundred and eighty-five horses, six hundred and five mules, five hundred and thirty-eight milch cows, one hundred and seventy-four work cattle, and one hundred and fifty-five hogs.

This county has within its borders one hundred and thirty-one and one-fourth miles of railroad, of which thirty-five and one-half miles belong to the Central Pacific Company, whose line passes through the northern portion of the county. The Eureka and Palisade Company owns ninety miles, which connects the town of Eureka with the Central Pacific Railroad. This latter company have also purchased the branch road from Eureka to Ruby Hill. It is used exclusively in transporting ore from the mines to the furnaces.

The Eureka and Palisade Railroad was completed in October, 1875. It has aided materially in the development of the mines of this district, and has added greatly to the business prosperity of the town of Eureka in making it the shipping point for all supplies to the different mining camps situated in southern Nevada. There are four quartz-mills in the county, of the assessed value of sixty-five thousand dollars, and fifteen furnaces assessed at two hundred and three thousand dollars. The chief industry is that of mining; the most valuable mines are located on Ruby Hill.

EUREKA DISTRICT.

The greatest activity in mining operations prevails in this district. The permanency of the mines has been fully established by the workings of the past two years. The bodies of ore are much more extensive and of a higher grade than those found heretofore. There has been a steady increase in the production of bullion; the shipments for more than a year past have amounted to upwards of a million dollars per month. The developments made in the deeper workings of the Richmond and Eureka Consolidated mines have assured to this district a prosperous and lasting season in mining. There is more ore now in sight in the different levels which have been opened in these two mines than has ever been shown at one time in any other district in this State, not even excepting the mines situated on the Comstock Lode. The greatest depth attained is but twelve hundred feet; and there is little doubt but that the deposits of ore now being worked, which was first discovered by the Rich-

mond company, and afterwards by the Eureka on its fifth level, will extend to a much greater depth. As yet, there is no evidence of its giving out; the indications are rather that it will increase in extent and richness as new levels are opened. The dividends already paid by the Richmond company amount to one million seven hundred and twenty thousand dollars; and by the Eureka, two million one hundred thousand dollars, a total of three million eight hundred and twenty thousand dollars. Besides these two mines there are others in this district, viz: the K. K., Jackson, Phenix, Connelly, Hamburgh, etc., which have produced considerable bullion already, and promise well for the future. There are also a great number of locations on Prospect Mountain which show well as far as they have been developed. The tunnel which has been started on the western slope of this mountain for the exploration of the mines here located, is a work of considerable magnitude and importance, as it is the intention of its projectors to drive it clear through the mountain. During the past summer the smelting works of the Richmond Company were destroyed by fire, the estimated loss of which was eighty-five thousand dollars. These have been replaced by others of a more substantial character. Improvements of every kind have kept pace with the requirements of the increased production of bullion. Furnaces of an improved style have been erected. Hoisting works have been enlarged, and everything tending to the supply of the mines, and the speedy and economical working of the mines has been provided for.

The following article on the geology of this district was prepared by Professor W. S. Keyes, and read at a meeting of the American Institute of Mining Engineers.

GENERAL GEOLOGY OF THE DISTRICT.

Immediately east of the long and narrow gulch, in which lies the town of Eureka, we find some high lava hills, which extend, uninterrupted by valleys, very nearly to White Pine, four hundred miles distant to the south-east. Bordering on the lava hills, and extending also west of the town a few hundred yards, are trachytic tufas of whitish or pinkish color. These rocks, probably volcanic ash, are used for building material. When freshly quarried they may be easily shaped with an axe, but on exposure they lose much water and become quite hard. The tufas extend southerly along the main gulch about one mile. South of the town we note also other gulches; the most westerly, called Goodwin Cañon, skirts along Prospect Mountain; the next, called New York Cañon, runs more or less parallel with the main gulch, and ends in a species of basin against a portion of Prospect Mountain; the next to the east follows along southerly, and, crossing a low divide, forms the highway to Scout Cañon District. The main gulch receives some minor tributaries from the east and passes on to Fish Creek Valley. At the point first mentioned, south of the town, where the tufas give out, occurs a prominent ledge of sandstone, from which rock has been taken for lining the smelting furnaces. This sandstone reef is largely developed on the eastern side of the Diamond Range, facing Newark Valley, and appears again some fifteen miles to the east, as a part of the coal measures at Pancake. It is hence called Pancake Rock. The mechanical aggregation of its quartz particles varies very much. In some specimens the sandstone is distinctly granular; in others it appears compact, tough, and close-grained. Only

the former variety is used for the furnaces; and when so used it must be built in with the edges of the bedding exposed to the fire, otherwise it shales off in large flakes. I have found but one fossil in the Eureka reefs. This appeared like a short section of a small wood screw about three inches long and nearly half an inch thick. The fossil was surrounded by a hollow cylindrical space, leaving the articulations free, the extreme ends of which formed part of the inclosing rock. The specimen has unfortunately been lost. In New York Cañon we find a series of true clay shales, which furnish the tamping for the furnaces. On the western side of the same gulch we find a high ridge of calcareo-silicious rock, called Silver Hill. This last contains some specimens of ore, and has been located for mining purposes. In places it has yielded some very rich ore carrying chloro-bromide of silver. No well marked deposit has, however, as yet been uncovered. A similar ore in similar rock has also been found on and near Adams Hill, about three miles west from the town.

Adjoining the town, a little south of west, are two hills of trachytic tufas, and again, west of these, an isolated hill of massive quartz or quartzite called Caribou Hill. In places, this hill shows some very rich specimens of chloro-bromide of silver, but not as yet in any great quantity.

Due south of the town and west of the main gulch, not delineated upon the map, is a high mountain of massive quartz or quartzite, whereon are situated the Hoosac and other mines. The Hoosac has yielded large quantities of antimoniacal lead ores, some of which were very rich in silver, but carried no gold.

In this respect, they, in common with the ores found in the silicious lime ridges, differ from the lead-bearing ores of the dolomitic limestones, all of which latter carry more or less gold.

Southwest of Caribou Hill, we come to Ajax Hill and Ruby Hill. The former is merely an easterly continuation of the latter. The quartzites and silicified limestones extend in a northerly and southerly direction, from Adams Hill on the north, to and beyond the Hoosac mine on the south. A heavy line of calcareous shales is found, more or less continuously, between the same points. They seem to bear some fixed relationship to the quartzites, and are probably the remnants of conformably deposited beds. Back of Ruby Hill, to the south, the high peak of Prospect Mountain towers about two thousand feet above the valley. It consists superficially of limestone, and has on both flanks many outcrops of ore, which seem to occupy a succession of gash veins. The ore is quite distinct from that of Ruby Hill. On the western side of the mountain, the quartzite reappears and extends to the south for several miles, in the direction of Spring Valley. Still west again, we find the limestones, wherein there are some few mining locations. The limestones extend onward to the west a distance of about sixty miles, until we approach Smoky Valley, which bounds on the east the Toiyabe range of mountains, in which are the granite formations of the Reese River and other districts. To the east of Eureka, the same broad belt of dolomitic limestone extends quite to the limits of the Great Basin, and is broken only by the valleys, and by occasional outpourings of the volcanic rocks, and rare appearances of the deep-lying granites.

The Eureka limestones carry Silurian and Devonian trilobites in but two places, as far as known at present. The one is at a point near the north-westerly end of Ruby Hill, in the direction of the extreme southerly spur of Adams Hill, and the other is in New York Cañon, directly east of the Mortimer mine, at a point about two and one half miles south of the

town. These fossils are all small; the largest being about the size of a finger nail.

GEOLOGY OF RUBY HILL.

The geology of Ruby Hill is quite simple. To the south we have a belt of quartzite. Just south of the claims of the Eureka Consolidated and Richmond we find the quartzite grooved out, and forming a narrow gulch running down to the valley on the west. Across this small gulch it rises and forms a small bare hill. To the east the quartzite continues along the K. K. and Phenix claims, and then turns to the southeast behind the claims of the Jackson, Jefferson, Shoo Fly, etc. Superimposed upon the quartzite we find an altered bed of dolomitic limestone, striking easterly and westerly, and dipping to the north and north-easterly. This forms the mineralogical zone, treated in this paper as a single lode or vein, whereon are located the Tiptop and Richmond claims, the Eureka Consolidated claims, the K. K., Phenix, Jackson and other claims. Beyond and geologically above this mineralized zone or veined limestone we find a more or less conformable belt of calcareous and argillaceous shales. Still further to the north and east we find the horizontally lying beds of country limestone, in which are occasional intercalations of an earthy stratum, apparently marl. The strata of the country limestone vary in thickness from an inch to a foot and over.

THE QUARTZITE.

This forms the foot-wall of the metal-bearing zone. Its general course through Ruby Hill is very nearly east and west, and its dip is variable, being sometimes nearly vertical, and again quite flat; on the average we may call it about forty-five degrees northerly. It seems to have exerted a predominating influence on the deposition and distribution of the ore bodies in the vein limestone. As early as 1864 in Mexico, and subsequently in 1867 in Montana Territory, I observed that the more permanent mines in the dolomitic limestones were always found at or near the points of junction with the quartzites, thus indicating that the latter had some bearing on the ore deposition. This observation has received abundant confirmation from the ore formation and distribution on Ruby Hill, as will appear more fully in the following pages.

After leaving Ruby Hill proper, and just before coming to the Jackson mine, we find the quartzite gradually curving around to the south-east and south. This change of direction of the foot-wall gives rise to two anticlinal folds in the vein-limestone. The main folding occurs south of the Phenix, and accords with the general north and south lines of upheaval of the district. The other, or minor folding, occurs on and near Ruby Hill, where the vein-limestone on the south side of the hill dips to the south, and that on the north side dips to the north. As a consequence of the variation of strike, we find the quartzite foot-wall bulging or buckling to the north, and forming great capes or promontories, which jut out into the vein-limestone.

On the line of claim heretofore mentioned, we find one very large and two smaller promontories, viz., one at the seventh length of the K. K., where, as will be observed on the map, the footwall drift makes out far

to the northeast; another at the extreme westerly end of the fifth level of the Eureka Consolidated, where the footwall turns suddenly to the south; and another, the largest of all, at the ninth level of the Eureka Consolidated, where its thickness is shown, by the straight gallery, to be over two hundred feet. These capes form wide basins between them, and in these depressions the ore is accumulated. The thickness of the quartzite footwall has not yet been determined. The K. K. has driven into it, at one place, one hundred and fifty feet; the Eureka drifts have penetrated it from two hundred and fifty to three hundred feet, and the Jackson Company has explored it by drifts for a distance of nearly seven hundred and fifty feet. The quartzite on the plane of contact with the vein-limestone is, almost universally, stained red and black with the oxides of iron and manganese; and where the surface waters have percolated along it, we find it soft, decomposed, and covered with a species of plastic clay "gouge," often several feet in thickness. Where, on the contrary, the dip is steep, say from eighty to eighty-five degrees, and unexposed to the action of water, we find it hard, and in close contact with the vein-limestone. Marks of motion are plainly visible, showing the effects of the sliding of the limestone. Often, as in the Phenix, we observe the clayey face of the footwall, with a half inch of manganese matted upon it, hard, and polished like ebony, with deep striæ running up and down. Near the contact, and for some distance away from it, we often find the footwall irregularly impregnated with iron pyrites, which, on assay, yield small amounts of gold. In but a single instance has this pyrites been found in a mass of any magnitude, viz., near the bottom of the Phenix shaft, which passed through it for twelve feet. Such contact impregnations, as is well known, are quite common in the wall-rocks of metalliferous veins.

Near the vein-limestone, the quartzite is much decomposed. Back from the line of contact it is hard and crystalline; so hard, indeed, that it requires blasting, and shows but faintly the original lines of bedding. At one time, encouraged by traces of gold and silver, the Eureka miners imagined that the quartzite would prove to be a ledge of milling ore. Many feet of drifts were excavated in the hope of finding pay ore, but all to no purpose. The rock was useful as a silicious flux for a temporary overplus of iron in the ore from the vein; and hence the cost of exploration was not wholly lost. Of late years no further attempts have been made to find "pay" in it, particularly as the traces of gold became less the farther the drifts were advanced away from the vein.

THE VEIN LIMESTONE.

During the progress of the recent litigation between the Eureka Consolidated and the Richmond companies a number of analyses were put in evidence by either party. We have three by Messrs. Luckhardt & Huhn, of the Nevada Metallurgical Works, and ten by Prof. Price of San Francisco.

Those made by the former gentlemen prove the vein-limestone to be, beyond question, a typical dolomite. Pure dolomite, as is well known, is a definite compound of about forty-six parts of carbonate of magnesia and about forty-five parts of carbonate of lime. But it very often happens that limestones present, to a greater or less degree, mechanical admixtures of the carbonate of lime, with dolomite, so that geologists, to avoid ambiguity, make use of the terms magnesian or dolomitic limestone.

Dana's *Mineralogy* gives analyses of dolomites carrying as high as fifty-seven per cent. of carbonate of lime and running as low as thirty-two per cent. of carbonate of magnesia, with some even as low as twenty-five per cent. of the latter.

Several of the analyses presented by the Richmond Company showed the rock to be a nearly typical dolomite, and but a single analysis showed it to contain less than six and three-quarter per cent. of the carbonate of magnesia.

The analyses of the vein limestone made by Messrs. Luckhardt & Huhn are marked Nos. 1, 2, 3, as follows:

| | 1. | 2. | 3. |
|-----------------------------------|--------|--------|--------|
| Carbonate of lime..... | 52.04 | 64.50 | 59.23 |
| Carbonate of magnesia | 43.24 | 34.20 | 36.63 |
| Oxide of iron and alumina..... | 1.19 | 0.70 | 2.70 |
| Silica..... | 1.65 | 0.12 | 0.43 |
| Alkaline carbonates and loss..... | 1.88 | 0.48 | 1.01 |
| Totals..... | 100.00 | 100.00 | 100.00 |

No. 1. was a sample taken from the main drift of the third level of the K. K. Mine, 100 feet northeast from the shaft.

No. 2. was a sample of brecciated matter taken from the tenth level of the Eureka Consolidated.

No. 3. was a sample taken, for a distance of 25 feet, along the main drift of the eighth level of the Richmond Mine, commencing at a point about 125 feet north-east from the quartzite footwall of the ledge.

The analyses of the vein limestone made by Prof. Price, marked from No. 4 to No. 13, both inclusive, are as follows:

| No. | Carbonate of Lime. | Carbonate of Magnesia. | Carbonate of Iron. | Alumina. | Silica and Silicate of Alumina. | Total. |
|-----|--------------------|------------------------|--------------------|----------|---------------------------------|--------|
| 4 | 53.14 | 44.35 | 2.32 | traces | 0.12 | 99.93 |
| 5 | 68.20 | 25.21 | 3.19 | traces | 2.50 | 99.10 |
| 6 | 79.25 | 17.38 | 1.17 | traces | 0.71 | 98.51 |
| 7 | 82.15 | 14.06 | 2.32 | traces | 0.80 | 99.33 |
| 8 | 85.32 | 11.03 | 0.87 | traces | 1.83 | 99.05 |
| 9 | 69.23 | 9.82 | traces | 19.60 | 0.25 | 98.90 |
| 10 | 89.20 | 7.56 | 1.59 | traces | 1.69 | 100.04 |
| 11 | 88.32 | 6.83 | 2.61 | traces | 1.32 | 99.08 |
| 12 | 89.26 | 6.74 | 1.88 | traces | 1.13 | 99.01 |
| 13 | 92.12* | 1.06 | 2.17 | traces | 4.10 | 99.45 |

No. 4 was a sample taken near the ore at the Tiptop incline of the Richmond Mine; No. 5, soft limestone from the second left hand cross-cut from the main Richmond shaft, near the end of the drift on the 800-foot level; No. 6, from the Bell shaft tunnel, fifty feet from the shale towards the shaft; No. 7, from the end of the Bell shaft tunnel; No. 8, hard limestone, taken from the 800-foot level of the Richmond Mine, inside of No. 1 winze; No. 9, from the stratum on which the ore rests at the Tiptop incline of the Richmond Mine; No. 10, from the Bell shaft

tunnel, taken a few inches from the line of contact with the shale; No. 11, from the limestone overlying the ore body in the Potts Chamber, between the fifth and sixth levels of the Richmond mine; No. 12, from several places in the Lizette Tunnel, between the Rossiter incline and the Champion "winze up;" No. 13, from a point near the Richmond boarding-house, on the line of contact with the shales.

We have also another analysis of the new limestone, marked No. 14, which was made from a sample taken at a point on the top of Ruby Hill, in a line directly south of the Bell shaft, on the claim of the Eureka Consolidated. This sample was analyzed by Messrs. Luckhardt & Huhn, and was apparently a piece of nearly pure calcspar. It contained carbonate of lime, 93.20; carbonate of magnesia, 1.68; alumina and oxide of iron, 0.60; silica, 2.05; water, 0.12; and alkaline carbonates and loss, 2.35; total, 100.

None of the samples analyzed for the Richmond Company were presented in Court. Hence, no description of them was attainable, other than the designations of the localities as above given.

No. 13 of the Richmond series was, like No. 14 of the Eureka series, very probably a piece of nearly pure calcspar.

From all of these analyses it will be apparent that even the seemingly pure calcspar is more or less magnesian. Also that the vein limestone is but very slightly silicious.

PHYSICAL PECULIARITIES OF THE VEIN LIMESTONE.

The most prominent of the physical appearances of the vein limestone is an entire absence of stratification, with the single exception of a small space of the surface ground, near the extreme western point on Ajax Hill, near the dividing line between the claims of the K. K. and Phenix Companies.

Here the apparently stratified limestone conforms in both strike and dip to the underlying quartzite. In the first level of the Phenix, at a point a little farther east, we find some remnants of this stratification. The limestone is, however, highly charged with oxide of iron, is soft and muddy, and crumbles to pieces at a touch. This spot seems to have escaped the general crushing of the strata. On the surface, aside from the ore outcrops, we find the vein limestone often stained red and black with the oxides of iron and manganese; also, ribbed and streaked where the carbonate of lime has been dissolved out by the pattering rain drops charged with free carbonic acid, leaving the carbonate of magnesia in high relief. Below the surface, we observe that the vein limestone has been crushed and shattered in every conceivable direction, sometimes in huge blocks, sometimes roughly crumbled like small fragments of marble; again crushed or disintegrated more finely, like coarsely powdered glass; and still again, as fine as the finest sand. This sandy limestone, and by the term sandy, we describe merely its mechanical aggregation, occurs generally over the ore bodies, and rarely on the footwall. When found on the footwall it is accompanied by large boulders of limestone, which appear as if worn and rounded by the action of water.

This fine material frequently gives rise to what the miners term "a run," filling up the stopes, mixing with the ore, and causing the workings to cave in. It has not yet been analyzed, but is, doubtless, the residue

of the less soluble portion of the dolomite. In color it is sometimes nearly white, sometimes ashy, drab, bluish or reddish.

The vein limestone is in many places brecciated and cemented together by calcareous exudations or infiltrations. This re-cementation has frequently been carried to such an extent that the vein matter has lost, not only all traces of its original stratification, but appears hard and compact, and rings under the hammer. Stains of iron and manganese, vugs containing low-grade ore, and large and small cavities, are found irregularly distributed throughout.

These cavities often form huge natural caverns many feet in extent, both laterally and vertically, the sides and tops of which are covered with glittering stalactites and thick incrustations of acicular crystals of arragonite. In the bottoms of the caves ore is invariably found.

The first discovered of the larger caverns was near the surface, on the southern side of the hill, beneath the original ore body of the Champion claim. This was from thirty to forty feet wide, about twenty feet high, and some sixty feet long. It lay almost in a direct line above the latest discovered huge cavern, the largest of all, at the extreme west end of the ninth level of the Eureka Consolidated. Another large cavern was found about two and one-half years ago, about the so-called fifth level bonanza of the Eureka, the roof of which fell in, and crushed through three levels of the mine, killing several miners. A large cavern was also found at the second level of the K. K., and in a line therewith a series of such caverns extended downward to the fifth level, where one could advance in an easterly direction a distance of one hundred and fifty feet. Recently, a large cavern has been discovered in the Jackson mine, beneath which, as is usual, a large body of ore appears.

These caverns form a marked characteristic of the vein limestone. They are nowhere found outside of the mineralized zone, and are due, beyond question, to the easy solubility of the carbonate of lime in surface water charged with free carbonic acid, coupled with the peculiar accessibility to such waters of the interior of this crushed and broken zone. Aside from the numberless fissurings in the mass of the vein-limestone, we find two main systems of fissure planes; the one, the cross fissure, running nearly north and south, at right angles to the underlying footwall, and the other more or less nearly parallel therewith. An exception to these two predominating lines of fissurings we find at the Lizette Tunnel in the Richmond mine. Here the fissure planes have the appearance of nearly level floors. All these fissure planes are strictly internal: are confined to the mineralized zone; never pass out into the underlying footwall, and never penetrate into the overhanging country rock, and hence, in no respect, resemble veins of any kind; they are strictly subordinate, and are merely local phenomena of the vein as a whole.

The most prominent of the cross fissures is to be seen at the second level of the K. K., a little west of the main shaft. It runs from the hanging wall to, or nearly to the underlying quartzite; has upon its sides vertical lines of motion, and reaches above the level a distance of fifty-five feet. It dips slightly to the east. Ore was found upon it a short distance north of the shaft, and from thence was found extending back to the footwall. Here, as elsewhere under similar conditions, the one has plainly been carried forward from the footwall along the fissure plane, and its position on the footwall cannot by any stretch of imagination be justly attributed to the fissure plane itself as a source of supply. At this point, the K. K. second level, ore was found upon the cross break a distance of nearly two hundred feet from the footwall; while the fis-

sure plane extended some eighty or ninety feet further in the same direction, without any ore or sign of ore, quite to the hanging wall, all these longer fissure planes, whether forming cross breaks or parallel breaks, seem to have resulted from some natural disturbance in the zone of mineralized limestone, and seem to bear some distinct relationship to the folding, bulging or slipping of the underlying footwall. Beneath the long cross break at the K. K. second level, developments have shown a sudden sinking or falling away of the quartzite, which fact readily accounts for the vertical fissuring just above it.

The nearly vertical fissurings in the Richmond mine, which that company sought to have recognized as a distinct vein, were not vertically the one over the other, but were, at each succeeding level, further to the north. The foot-wall beneath them has, we believe, caused their peculiar formation. As yet, the quartzite beneath the Richmond has been but slightly developed. Enough, however, has been shown by its abrupt change of course at the extreme end of the Eureka fifth level, and by its southerly, or abnormal dip at the southerly end of the Richmond sixth level, to warrant the conclusion that these fissurings were due to the change of strike and dip of the quartzite. To account for the floor-like fissurings at the Lizette tunnel, we need only note the fact that this is the end of the hill overlooking the valley, and that hence the body of lime-stone had free scope to push forward or slide upon itself. Such floor-like fissurings could not occur at any other point, for the reason that the vein-limestone is everywhere else closely hemmed in by the adjoining formations. These fissure planes all have a marked tendency to approach the quartzite; and wherever they have been followed down to the foot-wall, the ore is found extending upon the foot-wall, both above and below them, thus again showing that the ore upon them was taken from the foot-wall. In the vein-limestone we occasionally find extravasations of crystallized calcspar. They are, however, small in extent, and of such rarity as hardly to be worthy of mention.

This mineralized zone of limestone varies in width from a few inches up to four hundred and fifty feet, both distances being measured at a right angle with the underlying quartzite. Its mean width is about two hundred and fifty feet. The vein has a greater apparent width at the surface, near the center of the Eureka claims, and at the Richmond. This is due to the crowding over of the limestone to the south, above a surface fold of the quartzite, whence has resulted the second southerly dipping anticlinal, heretofore mentioned. The narrowest portion of the vein is found in the Jackson claim, where the abrupt change in course of the footwall has so far pushed out the quartzite that nothing but a seam of ore is found between the hanging and the foot-wall.

THE CLAY SHALE.

Bounding the vein limestone on the north, and marking the limits of mineralization of the zone, we find a distinct line of calcareous and argillaceous shale. This shale has been uncovered in the deep workings in the Jackson, and both on the surface and in the lower levels of the K. K., Eureka, and Richmond claims. It has been traced in the K. K., on the third and fourth levels, a distance of nearly two hundred feet in each; on the tenth level of the Eureka about two hundred feet, and for a considerable distance on the seventh and eighth levels of the Richmond.

Its general course where exposed, after leaving the Jackson, is more or less nearly ten degrees north or south of an east and west line. Its dip is much steeper than the average dip of the quartzite, varying from eighty to eighty-five degrees. It is plastic, with a slightly greasy look, and in color greenish or yellowish, like a talcose mineral. Although containing iron it is never reddened.

We have three analyses, Nos. 15, 16, and 17, of this material, made by Professor Price, as follows:

| | 15. | 16. | 17. |
|-------------------------------------|--------|--------|--------|
| Carbonate of lime | 66.92 | 10.29 | 26.12 |
| Carbonate of magnesia | 1.96 | 0.75 | 1.05 |
| Carbonate of iron..... | 5.82 | 6.09 | 17.50 |
| Alumina | traces | traces | traces |
| Silica and silicate of alumina..... | 24.81 | 82.21 | 54.50 |
| Totals | 99.51 | 99.34 | 99.17 |

No. 15 was a sample taken from the Bell shaft tunnel.

No. 16 was a sample taken at the foot of the seventh level of the Richmond.

No. 17 was a sample taken from the face of the eighth level of the Richmond.

Judging from these analyses, the shale is simply an argillaceous material, more or less mixed with carbonate of lime. The shale at the Bell shaft tunnel is within a very few feet of the surface, and seems to carry much less silicate of alumina than samples taken from the Richmond at points seven hundred and eight hundred feet beneath the surface. The percentages of clay are, however, amply sufficient to identify all three samples, and to distinguish them from the vein limestone.

EXTERIOR LIMESTONE.

Beyond the line of clay shale to the north we find a second body of dolomitic limestone, which forms the hanging wall country. This is distinguishable from the vein limestone from the fact that it contains no ore, no caverns, and no ore stains, or oxide of iron, except at two isolated minor localities. Near the surface it is apparently unstratified, or shows very faint signs of stratification. Beneath the surface, on the contrary, it is generally very plainly stratified, and has its lines of bedding resting upon and dipping slightly towards the clay shale.

The stratified country limestone can be seen to the best advantage at the Jackson mine. This company's new main shaft was located at a point several hundred feet north of the quartzite outcrop, and was sunk a distance of four hundred and sixty feet, all the way through distinctly stratified country rock. At the depths of three hundred and four hundred and sixty feet, levels were driven off to tap the vein. Both of them passed through the stratified limestone, cut the clay shale hanging wall, and passed into the metamorphosed unstratified vein limestone, through which they advanced to the quartzite footwall.

We have three analyses of this material, by Messrs. Luckhardt & Huhn, marked Nos. 18, 19, and 20, which prove it to be a typical dolomite, as follows:

| | 18. | 19. | 20. |
|------------------------------------|--------|--------|--------|
| Carbonate of lime..... | 52.01 | 54.84 | 54.76 |
| Carbonate of magnesia..... | 43.88 | 43.49 | 39.66 |
| Alumina and oxide of iron | 1.13 | 0.37 | 1.74 |
| Silica | 0.50 | 1.79 | 1.00 |
| Water..... | 0.09 | .... | 0.12 |
| Alkaline carbonates and loss | 2.39 | 0.01 | 2.72 |
| | 100.00 | 100.00 | 100.00 |

No. 18 was taken thirty feet north of the clay shale, in the Bell shaft tunnel.

No. 19 from a point one hundred and twenty feet north of the clay shale, in front of the Bell shaft tunnel.

No. 20 in the third level of the K. K., on the main drift easterly from the shaft, from a point about six inches to the north of the clay shale hanging wall.

We have also some analyses made by Prof. Price, marked Nos. 21 to 27, both inclusive, as follows:

| No. | Carbonate of Lime. | Carbonate of Magnesia. | Carbonate of Iron. | Alumina. | Silica and Silicate of Alumina. | Total. |
|-----|--------------------|------------------------|--------------------|----------|---------------------------------|--------|
| 21 | 58.24 | 37.80 | 1.32 | 1.02 | 0.63 | 99.01 |
| 22 | 56.23 | 27.46 | 2.32 | traces | 0.92 | 98.93 |
| 23 | 52.92 | 32.48 | 3.62 | traces | 10.15 | 99.17 |
| 24 | 88.34 | 4.98 | 1.59 | traces | 4.83 | 99.74 |
| 25 | 91.61 | 1.21 | 1.59 | traces | 4.73 | 99.14 |
| 26 | 88.21 | 1.36 | 2.32 | traces | 6.12 | 98.01 |
| 27 | 92.60. | 2.95 | 0.87 | traces | 1.62 | 98.04 |

No. 21 was taken on the northern side of the hill, very near the mouth of the Bell shaft tunnel; No. 22 from inside the Bell shaft tunnel; No. 23, from a small shaft between the Bell shaft and the main Richmond shaft; No. 24, a sample of the stratified limestone taken from a point twenty feet from the end of the seventh level of the Richmond mine. No. 25 was a sample of the stratified limestone taken from a point on the eighth level of the Richmond mine near the line of contact with the shale; No. 26, from a point near the Richmond Boarding-house, on the northwesterly side of the hill; No. 27, from a point on the southwesterly spur of Adam's Hill, to the north of and opposite to the Richmond Boarding-house.

The specimens from which these analyses were made were not shown in court, and hence no description is obtainable beyond the mention of the localities. It will be observed, however, that the analyses Nos. 21, 22, 23 from samples, taken from the Bell shaft tunnel and its vicinity, correspond satisfactorily with the results obtained by Messrs. Luckhardt and Huhn. These still further confirm the statement that the rock is very nearly a typical dolomite. Every sample, without exception, proves the country rock to be more or less magnesian.

MICROSCOPICAL ANALYSIS.

In order more definitely to investigate the interior or vein limestone and the exterior or country limestone, specimens of each were ground down to a thin film and carefully examined. The samples thus selected were portions of the same pieces from which analyses Nos. 2 and 19 were made by Messrs. Luckhardt and Huhn. The former is a characteristic sample of the vein limestone, and the latter of the country limestone. Examined under the microscope, the exterior limestone appeared homogeneous, while the vein limestone, on the contrary, showed an entirely different mechanical aggregation of the particles. The different particles seem to be cemented together with a pasty substance in a manner unlike those of the country rock.

Beyond the exterior or country limestone, we find a comparatively broad belt of highly tilted calcareous shales, which have been heretofore mentioned in describing the general geology of the district.

ORES AND ORE BODIES.

All the ores of the Eureka lode bear a striking similarity. They consist, in the main, of highly ferruginous carbonates of lead. Subordinately, we find oxide of lead, arsenio-chloride of lead, molybdate of lead, sulphate of lead, arseniate and carbonate of iron, oxide of zinc, galena, iron pyrites, and rarely oxides and carbonates of copper. They are, in a word, chiefly oxidized ores, the product of the decomposition of galena, and of iron and arsenical pyrites, all carrying a greater or less percentage of gold and silver. The workable ore ranges in value from forty dollars to seventy dollars and upward in gold and silver, with from sixteen to thirty per cent. of lead to the ton of two thousand pounds. The richest ore is that species of carbonate of lead called by the miners "black carbonate."

This ore carries sixty to seventy per cent. of lead, and assays in gold and silver from one hundred dollars to three hundred dollars per ton. It occurs most commonly in streaks and masses, at or near the foot-wall.

At the K. K. third level we find a huge mass of nearly pure quartz ore, carrying scarcely a trace of lead. This occurrence is entirely unusual in the mines of Ruby Hill. This ore is quite rich in gold and silver, yielding by assay from twenty-five dollars to one hundred and seventy-five dollars per ton. It lies nearly midway in the ore channel; extends above the level about twenty-five feet and below it a distance of about forty-five feet; the cross drift shows its width to be nearly ninety feet. Its length has not yet been definitely developed. Over it was found a rich streak of carbonate of lead, which dipped down behind it to the foot-wall. The quartz is not hard and compact, but has a sugary texture, as if deposited from water. It lies directly beneath the narrow gulch which heads on Prospect Mountain. The only ore ever found on the hill resembling this was a portion of the outcrop at the Buckeye, which was very silicious. The ores in general, as well as the vein limestone, carry very small amounts of silica.

The outcropping of ore on Ruby Hill was originally found on the Champion and Buckeye claims on the south side. It appeared here as an

earthy looking oxide of iron, with which some carbonate of lead and galena were intermingled. This ferruginous matter was found irregularly distributed over a space four hundred and eighty feet in width, between what is now called the Lupita excavation on the north, and the Buckeye on the south. To describe the outcrops in their order, we may begin at the extreme westerly end of the hill. There we find the Richmond-Tiptop ore body appearing in a small cave on the side of the hill, and two or three smaller bodies of low grade ore at the shafts further to the north-west. Below them and near the quartzite contact, other bodies of ore were subsequently found.

Between the Tiptop incline and the Champion claim we find, also, a rather prominent outcrop at the Virginia or Iron shaft, and three minor patches of low grade ore at other points. Thence proceeding easterly, we find the large surface chamber of the Champion; then the huge connected outcrop at the Buckeye; thence nearly due east we find the surface ore chamber of the Sentinel; thence easterly again, in the ground of the K. K., we have the Marcellina outcrop; thence, in the same direction, we have the two outcrops at the two small shafts in the gulch; thence, a little south of east, and still upon the K. K. claim, we find the Carson outcrop; thence south of east we have the Deap and Phenix outcrops, and, lastly, south-east, we find the Jackson outcrop.

Between the Jackson and the Tiptop we can enumerate a total of thirty-four outcrops, all of considerable extent. Most of them were originally quite small, some, like the Buckeye and Champion, developed to an enormous extent. The extreme points of these claims are over eight hundred feet apart, and the ore has been traced almost the entire distance.

When first discovered, the ground between these points appeared to be nothing but limestone, which, however, subsequently proved to be merely a thin capping of cemented debris.

The largest surface body visible in 1869 and 1870 was the first bonanza of the Jackson. This was an egg-shaped mass of ore about seventy feet long, twenty feet high, and thirty feet broad. It did not descend to any further depth, and showed no visible connection with any other ore body.

The Tiptop outcrop, as already stated, was found inside a small cave. So little did it attract attention that the Richmond locators who had placed their notice, as is reported, at the iron shaft, very near it, failed to observe it. They took no steps to secure it until ore was found in it by the Tiptop miners. To the latter it properly belonged, but the former party claimed it as being on their location, and after much wrangling the dividing line was fixed at the cave.

None of the Buckeye or Champion surface ore bodies extended to any great depth, for the reason that the quartzite footwall lay close beneath them, to which they, in almost every instance, extended. The exceptions to this well-defined law of the ore bodies were the first surface chamber of the Champion and some minor stringers near the Buckeye shaft. These ran up the hill to a thin point, and were in shape something like the glass Prince Rupert drops. Beneath both, however, were other large and valuable bodies of ore, which dipped down to the footwall.

Pursuing our investigations beneath the surface, we find the main ore bodies either upon or tending directly towards the underlying quartzite. Those which do not obey this law are simply spurs and branches making up into the vein limestone. In the K. K., below the third level, all the ore is found immediately upon the contact. On the

fifth level we follow the pay ore along the quartzite a distance of nearly three hundred feet. The new fourth level ore body starts in the vein limestone, and as it dips will soon reach the quartzite.

In the Eureka we find the ore along the contact for a distance of fifty to one hundred and fifty feet. The largest and most valuable shoot of ore ever discovered in this mine is found upon the quartzite at the extreme westerly end of the fifth level. Here the footwall, as already mentioned, makes a sudden bend to the south-west, and upon it is found a thick mass of rich black carbonate, making downward on both sides of the promontory. A portion of this ore continues down on the westerly side of the quartzite cape, passes across the dividing line of the claims, and becomes the property of the Richmond Company. Another and probably larger portion makes its way downward north-easterly along the contact (not, however, with uniform and connected richness), till it expands into a very large body at the ninth level. Here we find a huge cavern at the north-west end, in and beneath which the bonanza attains its greatest development. Beneath the ninth level the ore continues downward, on the line of contact, as far as the workings extend, a distance of one hundred and sixty feet. At the lowest point a level has been driven east along the quartzite over two hundred feet, which carries high grade ore the entire distance.

The Jackson Mine, also, half a mile to the south-east, carries fine black carbonate on the footwall, at the 460-foot level, for a distance of about two hundred feet. The ore body underneath the cavern in this mine, is not upon the footwall, but its dip is such as will certainly carry it to that point.

The Richmond ore bodies, on a superficial examination as far as the fifth level, would seem to belong to a different system. The outcrop starts in limestone, whence the ore dips down gradually to the bottom of the incline. Here we find the slopes extending north-easterly and quite flatly, to a point a little beyond the north-easterly side line of the Lookout patent. At this point we pass down through the Rossiter Incline, and come to the Flat Chamber, an almost horizontal body of ore. Thence we pass down through steep winzes, through the intermediate levels, until we come to the Potts Chamber. The ore is not continuous throughout the entire distance, but is broken at two places, where the ore stains are either very scanty or totally absent.

Viewed as a whole, this ore-shoot is made up of a string of ore bodies following one another irregularly downward and forward to the north-east. The developments have taken this direction rather than a northerly or north-westerly course. Had the latter been pursued, the ore-shoot would very likely have been shown to connect with the ore bodies at the west of the shaft on the fifth level.

One portion of the Potts Chamber connects with the quartzite. Low grade ore and ore stains are found upon the footwall, and from thence to the ore stopes only ten feet distant. On the Richmond footwall, at the point 69 B, fine carbonate ore is found.

It will thus be seen that the Richmond series of ore bodies, like all the rest in the mineralized zone, approaches the footwall in depth. Below the Richmond sixth level, in the drift 6 L, low grade ore is found extending southerly a distance of fully one hundred feet. Directly opposite to this drift, at the same depth, we find the Eureka drift, 10 E, advancing to meet it; ore stains and low grade ore are found in this also.

There now remain but a very few feet to connect the two. There is

no reason to doubt that the low grade ore will continue, and thus bring the Richmond ore shoot definitely down to the footwall.

Besides the ore bodies in or near the quartzite, we find, as the walls approach in depth, considerable deposits upon the hanging wall.

Still again we find numerous isolated bodies away from either contact. The Eureka has uncovered such bodies on several of its levels. The Richmond, also, has two such bodies on its fifth level west of the shaft, which are quite large, and which promise to be valuable.

They have another isolated body near to the shaft on the eighth level at a point forty-four feet away from the footwall; also, several smaller bodies in the winze near the shaft connecting with the ninth level; also at several places in the Lizette Tunnel. In addition to the isolated bodies just enumerated, we find low grade ore and ore stains very generally scattered throughout the vein limestone wherever drifts have penetrated it.

Assays of a large number of these ore stains, taken from various localities on the surface and beneath it, were put in evidence in the recent suit. As fair samples we may present the following: No. 2, \$12.55; No. 3, \$5.80; No. 4, \$2.19; No. 44, \$3.60; No. 47, \$5.74; No. 48, \$3.92; No. 49, \$3.14.

Numbers 2, 3 and 4 were from the surface of the Richmond. No. 44 was from the extreme westerly end of the Eureka third level; Nos. 47, 48 and 49 were from the Eureka ninth level.

Ore extends in the Jackson mine from wall to wall at the point on the 460-foot level where the quartzite and shale come nearly together. A like phenomenon is visible at the K. K. third level, where the walls are two hundred and eighty feet apart.

The Potts Chamber also touches the hanging wall at the bottom of the winze, 6 G, on the sixth level of the Richmond, and comes within 10 feet of the foot-wall at the point on the level above heretofore noted. The ore bodies generally follow the depressions of the footwall, and occasionally pass across the promontories.

Those in the Richmond, pitch northerly and north-easterly; those in the Eureka, northerly, north-westerly and north-easterly; while those in the K. K. pitch mainly north-easterly. I use the word pitch, as contradistinguished from dip, to denote the inclination of the ore shoots laterally. The dip, in strictness, must be at right angles to the course, and hence does not describe a variation from that direction.

Elaborate maps were put in evidence during the late suit by the Richmond Company, prepared by their surveyor, Mr. Westcoat. The company, moreover, exhibited a glass model, constructed on a different system from that above described. In this model the main sections were horizontal, and vertical sections taken at will were represented by introducing vertical glass plates between the horizontal ones. The effect was to give a striking representation of those bodies of ore which it was desired to emphasize, and to omit the rest almost entirely. The two models reduced to the same scale, and taken together, would have given a fair complete picture.

It will sufficiently appear from the foregoing description that the mineralized limestone zone of Ruby Hill, which I have called a lode or vein, is not so-called because it conforms strictly to the definition of a fissure vein, given in the books. The term has been used in the miners' sense, and in the sense in which, as the court declared, it is employed in the law. At the same time my object has been to describe fully the thing itself; and if any exact and recognized English name for it can be

suggested, I shall be glad to hear it. The latest writers, at home and abroad, confess that the deposits of lead ore in limestone do not strictly fall under the old Saxon classification. This is from the declaration of Prof. Cotta, who may be regarded as one of the authors and the chief representative of that classification. But I leave to other hands the theoretical discussion of the phenomena, and of the principles, both of geology and of mining law, illustrated by them.

EUREKA CONSOLIDATED.

The past two years has been a season of unparalled prosperity in the history of this mine. Never since the discovery of the mines on Ruby Hill have such immense bodies of rich ore been disclosed as those opened in this mine since my last report. In all the levels from the fifth down to the twelfth, rich ore has been found. There are miles of drifts, winzes, cross-cuts and stopes opened up in the ore, and as yet not more than one half the ground owned by this company has been explored above the levels which have been opened. For nearly a year regular monthly dividends of three dollars per share have been paid on the capital stock of the company to the shareholders; and the ore disclosed in the mine is sufficient to insure regular dividends for some time to come. The furnaces belonging to the company have been run to their utmost capacity. During the past year an additional furnace has been erected. Mr. Donnelly, the superintendent, in his annual report to the president and trustees, at their meeting in October, says: Since the last annual meeting of the company, six thousand one hundred and two feet of drifts have been run, and fifteen hundred feet of winzes sunk. Nearly all of the prospecting work has been done in the west end of the mine, between the seventh and twelfth levels. Owing to water being struck near the Lawton shaft, no work has been done at that end of the mine below the ninth level during the past year, leaving more than one half of the mine unprospected, which is likely to prove as productive as the portion of the mine already developed. A large, double-compartment, incline winze has been started from the ninth level, about the middle of the company's ground, and sunk a depth of four hundred and twenty feet, and stations opened at tenth, eleventh and twelfth levels. Good ore has been found on the twelfth level, insuring an abundant supply of ore to keep the furnaces running to their full capacity for the next year.

The secretary's report for the year ending October 12, 1878, shows the following receipts, expenditures, resources, etc.:

Receipts.

| | | |
|---|----------------|----------------------|
| From proceeds 15,199 tons base bullion refined..... | \$3,786,111 88 | |
| From proceeds sales flue dust..... | 50,630 80 | |
| From proceeds sales sundry supplies by Supt. | 1,457 61 | |
| From rebate allowed on bullion freight..... | 4,083 95 | |
| From J. & W. Seligman & Co., advances on shipments..... | 110,000 00 | |
| From Laidlaw & Co., advances on shipments | 1,251,715 70 | |
| From estate Thos. H. Selby, deceased..... | 32 68 | |
| Balance H. Donnelly, Supt., Oct. 10, 1877... | 319 60 | |
| Balance cash on hand, Oct. 10, 1877..... | 25,062 15 | |
| BALANCE ACCOUNT.—Supt's drafts (outstanding) | 5,965 86 | |
| Bills for supplies (not due)..... | 2,878 47 | |
| | | <hr/> \$5,238,458 70 |

*Disbursements.**Mine Account—*

| | | |
|--|--------------|---------------------|
| For Labor..... | \$258,958 37 | |
| “ Hauling Ores..... | 58,869 56 | |
| “ Timber and Lumber..... | 87,140 45 | |
| “ Wood and Coal..... | 17,783 34 | |
| “ Castings and Foundry Work..... | 18,738 17 | |
| “ Iron, Steel, Tools, Hardware, etc..... | 10,853 13 | |
| “ Freight on Supplies..... | 11,077 18 | |
| “ Powder, Fuse, and Caps..... | 5,982 82 | |
| “ Candles and Oil..... | 5,983 00 | |
| “ Surveying..... | 925 00 | |
| “ Assaying and Assay Material..... | 2,284 24 | |
| “ Blacksmithing..... | 320 00 | |
| “ Brick and Mason Work..... | 97 50 | |
| “ Boiler, Tubes, etc..... | 626 50 | |
| “ Flexible Steel Wire Rope..... | 496 74 | |
| | | <hr/> \$ 480,136 00 |

Smelting Account—

| | | |
|--|--------------|---------------------|
| For Labor..... | \$174,512 78 | |
| “ Charcoal..... | 575,815 08 | |
| “ Wood..... | 12,801 64 | |
| “ Iron, Steel, Tools, Hardware, etc..... | 9,471 49 | |
| “ Lumber..... | 5,060 50 | |
| “ Oil, Candles, and Tallow..... | 2,182 20 | |
| “ Fire Rock..... | 7,456 95 | |
| “ Scrap Bullion..... | 61 50 | |
| “ Assaying and Assay Material..... | 2,828 23 | |
| “ Freight on Supplies..... | 5,466 37 | |
| “ For Sacking and Loading Flue Dust..... | 194 12 | |
| “ Castings and Foundry Work..... | 13,973 27 | |
| | | <hr/> \$ 809,824 13 |

General Expense—

| | | |
|---|-------------|--------------|
| For Salary Supt. and employees..... | \$14,250 00 | |
| “ Books, Stationery, Printing and Newspapers..... | 605 65 | |
| “ Express Charges, Franks and Telegraphing.. | 388 85 | |
| “ Hay and Grain..... | 2,034 66 | |
| “ Insurance..... | 600 00 | |
| “ Tax on Proceeds of Mines..... | 42,535 78 | |
| “ State and County Taxes..... | 1,885 53 | |
| “ Legal Expenses..... | 525 80 | |
| “ Exchange..... | 27 10 | |
| “ Harness and Repairs..... | 92 25 | |
| “ Blacksmithing..... | 286 50 | |
| “ Purchase Horses..... | 600 00 | |
| “ Purchase Buggy..... | 127 50 | |
| “ Furniture..... | 75 00 | |
| “ Salt, Soap, Sponges, etc..... | 7 50 | |
| “ Donations to Fire Department..... | 50 00 | |
| “ “ “ Fourth of July..... | 50 00 | |
| “ Assaying..... | 57 00 | |
| | | \$ 64,197 12 |

Expenses San Francisco—

| | | |
|---|------------|------------|
| For Salary Officers and traveling expenses..... | \$6,535 00 | |
| “ Office Rent and services Porter..... | 1,080 50 | |
| “ Printing, Advertising and Newspapers..... | 493 75 | |
| “ Books, Stationery, Express Charges and Tele- graphing..... | 463 76 | |
| “ State, City and County Taxes..... | 10 66 | |
| “ Retaining Stock on Call List of the Board.... | 200 00 | |
| “ Coal and Wood..... | 56 00 | |
| | | \$8,839 67 |

Freight, Refining, Etc.

| | |
|---|------------|
| For Transportation, Refining Charges, etc., on Base Bullion (@ \$55 30)..... | 840,592 58 |
|---|------------|

Interest—

| | |
|---------------------------------|----------|
| For Interest on overdrafts..... | 4,840 48 |
|---------------------------------|----------|

Legal Expenses—

| | |
|-------|-----------|
| | 16,758 15 |
|-------|-----------|

Dividend Account—

| | |
|---|--------------|
| For Nos. 24 to 35, paid stockholders..... | 1,800,000 00 |
|---|--------------|

J. & W. Seligman & Co.—

| | |
|--|------------|
| For Advancements on Bullion Shipments..... | 681,951 29 |
|--|------------|

Laidlaw & Co.—

| | |
|---------------------------------------|------------|
| For Advance on Bullion Shipments..... | 485,993 07 |
|---------------------------------------|------------|

Superintendent's Draft—

| | |
|---|-----------|
| For Drafts carried over from last year..... | 11,908 37 |
|---|-----------|

Book Accounts—

| | |
|--|----------|
| For Bills carried over from last year..... | 5,553 40 |
|--|----------|

Balance, H. Donnelly, Supt.—

| | |
|---|-----------|
| October 12, 1878..... | 197 72 |
| Balance Cash on hand, October 12, 1878..... | 27,666 52 |

\$5,238,458 70

Resources.

| | | |
|---------------------------------------|--------------|--------------|
| Cash on hand..... | \$27,666 52 | |
| H. Donnelly, Supt..... | 197 92 | |
| 4306 tons Base Bullion..... | \$861,200 00 | |
| Off Advances..... | 765,722 63 | |
| | <hr/> | 95,477 37 |
| 4,036,189 pounds Lead at 3 cents..... | \$121,085 67 | |
| Off Advances..... | 73,048 71 | |
| | <hr/> | 58,036 96 |
| Supplies on hand, per Inventory..... | 27,234 55 | |
| Charcoal " "..... | 40,716 27 | |
| | <hr/> | \$249,329 59 |

Liabilities.

| | | |
|--|----------|--------------|
| Superintendent's Drafts (outstanding)..... | 5,965 86 | |
| Bills for Supplies (not due)..... | 2,878 47 | |
| | <hr/> | 8,844 33 |
| Net Resources, Oct. 12, 1878..... | | \$240,485 26 |

Cost of Extracting Ores.

| | | |
|--|--------------|--------------|
| Expense of extracting and hauling to furnace 72,- 352 tons of ore is..... | \$480,136 00 | |
| Supplies on hand Oct 10, 1877..... | 8,875 86 | |
| | <hr/> | \$489,011 86 |
| Less supplies now on hand per Inventory..... | 11,462 87 | |
| | <hr/> | \$477,548 99 |
| Or \$6.60+ per ton delivered at furnaces. | | |

Cost of Smelting Ores.

| | | |
|---|--------------|--------------|
| Expense of smelting 71,352 tons of ore is..... | \$809,824 13 | |
| Supplies on hand Oct. 10, 1877..... | 70,730 85 | |
| | <hr/> | \$880,554 48 |
| Less Supplies now on hand, per inventory..... | 56,487 95 | |
| | <hr/> | \$824,066 53 |
| Or \$11.56 $\frac{1}{2}$ per ton. | | |
| 71,352 tons of ore reduced, produce 16,342 tons of Base Bullion; 4.366+ tons of ore produce one ton of bullion, at a cost of..... | \$79 30 | |
| Add transporation and refining charges, etc., say | 75 00 | |
| | <hr/> | 154 30 |

Comparative Cost of Extracting and Smelting Ores.

| | | |
|---|---------|--------|
| Cost of mining a ton of ore in 1873 | \$11 18 | |
| Cost of smelting a ton of ore in 1873..... | 18 37 | |
| 8.04 tons of ore produced one ton of bullion, at a cost of | | 237 69 |
| Cost of mining a ton of ore in 1874..... | 13 70 | |
| Cost of smelting a ton of ore in 1874..... | 15 80 | |
| 6.91 tons of ore produced one ton of bullion, at a cost of | | 210 02 |
| Cost of mining a ton of ore in 1875..... | 8 34 | |
| Cost of smelting a ton of ore in 1875..... | 13 09 | |
| 8.53 tons of ore produced one ton of bullion, at a cost of..... | | 182 54 |

W. W. TRAYLOR, Secretary

RICHMOND CONSOLIDATED.

This mine has steadily increased in value during the past two years. New and extensive bodies of ore have been opened, which insure it a prosperous career for an indefinite period in the future. The different levels show well, and immense quantities of ore are on the dump ready for transportation to the furnaces. The Air Compressor and Burleigh drills are used to great advantage in carrying forward the necessary explorations. The most successful run ever made by this company's furnaces was from September, 1877, until they were closed for repairs in August, 1878. During this period, fifty-three thousand seven hundred and seventy-five tons of ore were smelted. On September 27, the furnaces, buildings, machinery and a large supply of coal were destroyed by fire. The furnaces were undergoing repairs, and were almost ready to be fixed up at the time of the disaster. The value of the property destroyed was about eighty-five thousand dollars. The greatest misfortune to the company, however, was not so much on account of the loss of the furnaces as it was by reason of the interruption of its yield of bullion and the loss of time necessary for the erection of other furnaces. With commendable energy the company immediately set to work to repair the damage, and already more substantial and complete smelting works have been erected, which are now about ready to commence operations. The new works consist of three seventy-ton furnaces, and one of the capacity of forty tons. They are situated upon the site of the old works at the southern or upper end of the town of Eureka. The dimensions of the main building are one hundred and seventy feet long by sixty-four feet wide. A seventy-five horse-power engine, with three boilers sixteen feet long by four feet in diameter, and one sixteen feet long by five feet in diameter, furnishes the motive power for the machinery. The furnaces are constructed in the most substantial manner, and so as to secure the greatest economy in their operation. Their capacity is greater than that of the old ones, and many improvements have been added. The arrangement of the machinery is compact and convenient.

The ore bins have a capacity of twelve hundred tons, and those for coal one hundred and fifty thousand bushels. The following summary of work in the mine is from the Superintendent's October report: Since my last, explorations in the mine have been carried on with great vigor and with very good results. The four hundred drift in the same character of rock as last reported, it being on the contact of quartzite and limestone, is very favorable ground for drifting. The winze below No. 7 chamber is holed to the five hundred level, which will enable us to stope much more economically than we have been able to do for some time past. The drifting of the five hundred in fissure has been resumed; we are working a drill on this drift, which will be the means of exploring more rapidly; the present end is in good ground for drifting, and favorable looking for ore. A drift has been started north from No. 1 winze in fissure on the five hundred level; the ground is favorable for drifting; this drift we are working with the Burleigh drill. No. 2 winze is down fifty feet; the bottom is in limestone; this winze has been started on an incline, regardless of the ore, to connect with the six hundred, which is drifted for ventilation and ore-shoot. From the top of No. 2 rise, thirty feet above south drift from incline, a drift has been driven forty feet in good ore, and the end still in high grade ore. The present end of this work is twenty feet above the five hundred, thereby clearly showing that the ore is making up strong and good. No. 3 winze has been abandoned, for the time being, for lack of air; this ground will be explored from the six hundred. The six hundred in quartzite is without change; the ground is still favorable for drifting. The six hundred main drift west is looking very favorable for ore; the present end is in limestone, with seams of red stained lime. A cross-cut has been started from the end of this drift to connect with No. 2 winze, being sunk below the five hundred. The eight hundred is being drifted on the contact of quartzite and limestone; ground favorable. The drifting of the nine hundred feet west, has been suspended for the past few days, but will be resumed with the Burleigh as soon as we can get the pipes in, which will be in the course of two or three days. We are pushing in the reconstruction of the smelting works as fast as possible, and if we are not retarded in getting material ordered from San Francisco and elsewhere, we shall be ready for smelting by December first.

ALBION.

This is a recent location, and was made by employees of the Richmond company to the west of that company's ground, in the belief that the ore bodies now being worked in the Richmond would pitch into the Albion ground. The company has been organized, incorporated, and active operations commenced for the development of the claim. The ground embraced in this location is fifteen hundred feet long by eight hundred feet in width, and joins the Richmond on the west. Substantial hoisting works have been erected, and the shaft has already reached a depth of about four hundred feet. This shaft has two compartments and is well timbered from top to bottom. A station has been cut out at the three hundred and thirty-five foot level, and from this point a drift has been run to the north-west and another to the south-east. In the south-east drift a body of ore, eleven feet in width, was cut at a distance of twenty-one feet from the shaft. The ore is low grade, containing gold, and resembles somewhat in its character the Richmond ore. The shaft

is situated on the western slope of Ruby Hill near its base. It is very accessible, and has plenty of room for waste, dumps, and ore bins. If the locators of this claim are correct in their theory as to the extent of the Richmond ore body, the Albion will soon be yielding bullion, as the explorations are being pushed forward with the greatest energy.

K. K. CONSOLIDATED

Work has been suspended in this mine for some time past, owing to an influx of water which the company was not prepared to handle. Pumping machinery has been put in place, and soon the work of extracting ore will be resumed. This mine has yielded a large amount of ore during the past two years, and considerable quantities still remain in sight in the lower levels. The K. K. is situated on the main Ruby Hill lode, and joins the Eureka Consolidated on the east. The equipments of the mine are in good condition, and as soon as the water is lowered, the work of exploration will be vigorously prosecuted. The furnace belonging to this company and situated at the upper end of the town of Eureka, has produced a large amount of bullion. The bullion yield of the K. K. mine has been one million six hundred and nine thousand three hundred and eleven dollars and eighty-five cents.

PHENIX.

During the past summer some important developments of high grade ore have been made in this mine. It is situated south-east of the K. K. mine, and is one of the oldest locations in the district. Extensive hoisting works have been erected over the old shaft. This shaft has been retimbered from top to bottom, a distance of five hundred and fifty feet. It has two compartments, four feet by eight. The superintendent's latest official letter gives the following concerning the present condition of the mine. Finding that the flow of water in the shaft had increased from fifty gallons an hour, as per last report, to two hundred and fifty and three hundred gallons per hour, and that our tub was too small to control the amount of water, we stopped the work of sinking, and have constructed a tank holding two hundred gallons, and will resume to-night. The main north drift on the fifth level has been extended twenty-five feet; total length two hundred and twenty-four feet. Face in quartzite. East drift from shaft extended twenty-five feet; total length one hundred and thirty-eight feet. Face in quartzite. West cross-cut from north drift extended twelve feet since our last report; total length seventy-five feet. Face in ledge matter and quartzite. Fourth level, east drift from shaft extended twenty-five feet; total length one hundred and twenty-five feet. Face in good ledge matter favorable for soon finding ore. We have an east cross-cut started from main north-west drift (at a point one hundred and eight feet from shaft) now in sixty-six feet face in ledge matter. Have also a west cross-cut started from the main north-west drift (at a point one hundred and forty-eight feet from shaft) now in one hundred and forty-one feet. At a point two hundred and fifteen feet from shaft have extended main north-west drift nineteen feet in a straight direction.

We have commenced a west cross-cut (No. 2) at a point on north-west drift three hundred and eleven feet from shaft, now in eleven feet. Also a north-east cross-cut from the same drift at a point four hundred and twenty-one feet from shaft, now in twenty-seven feet. Both of these last named cross-cuts are passing through ledge material. Third level: Have extended east cross-cut forty feet, now in one hundred and ninety feet from main drift, face in good ledge matter. I have strong hopes of finding ore in one or more of our drifts on the fourth level, and feel sure of striking it with our main north drift from the fifth level, as soon as we pass through the quartzite, and before encountering the ore body we left in the four and one half level coming from the K. K.

JACKSON.

New developments of ore have been made in this mine during the past year and considerable ore extracted. This is one of the old locations of the district, and has produced largely in bullion. The present prospects of the mine are much better now than for some time past. The new shaft has reached a depth of four hundred and fifty-nine feet, but the work of sinking has been stopped, in order to explore the levels already started. The chief work is being done on the third level, where a good body of ore has been found. From the four hundred and fifty foot level a winze has been sunk a distance of one hundred and thirty-five feet. This shows ore of a good character all the way down. From present indications, the Jackson will soon again become prominent as one of the large bullion producers of the district.

HAMBURG.

This mine is situated at the head of New York Cañon, and is supposed to be on the same ore channel with the Eureka Consolidated and Richmond. The ore is similar to that obtained from these mines, although the distance between them is upwards of two miles. The mineral belt here is also bounded by quartzite to the north and limestone to the south. The ore-bearing lode or belt is over five hundred feet in width, and in it caves are found filled with rich ore, very similar to those in Ruby Hill. The Hamburg shaft has reached a depth of six hundred feet. The ore body runs north and south and pitches north-east. On Ruby Hill they run east and west. This mine has produced bullion of the value of two hundred thousand dollars. There is a great deal of ore in sight in the mine, and about forty tons are shipped daily to the Atlas furnace, which is kept running on ore from this mine. The hoisting works and equipments for working this mine are in excellent condition. The Superintendent's last official letter says: "During the week ending, work has progressed as usual. The stopes above the two hundred and fifty foot level show some improvements. Below the two hundred and fifty foot level, there is no material change to note in the appearance of the ore bodies. We have discontinued the sinking of the winze below the four hundred and fifty foot level, which is now down eighty-six feet, and will connect with the upraise from the six hundred foot level. In the south

drift, the bottom of the winze shows a wall of vein matter, with occasional bunches of good ore. The work of timbering the south drift in the six hundred foot level is now completed. Will start an upraise to connect with the winze from the four hundred and fifty foot level, as soon as the cross-cut is sufficiently advanced. The furnace has run without interruption. We have shipped, to date, one hundred and thirty tons of bullion, which was reduced from seven hundred and fifty-two tons of ore."

CHARTER MINING AND TUNNEL COMPANY.

This company is organized under the laws of the State of Nevada. The capital stock consists of one hundred thousand shares of the par value of one hundred dollars each. Twenty-five thousand shares have been set apart as a working capital. This tunnel had been driven a distance of five hundred and ten feet before the incorporation of the present company. It enters Prospect Mountain on the western slope. The company own a number of locations on the line of the tunnel, which have yielded some good ore. This enterprise is of great importance to those owning mining locations in this part of the district, as it is intended to tap not only the veins belonging to the company, but also all that may be found in this section of the Prospect Mountain. The tunnel has been enlarged, a good track laid, and is in now a distance of six hundred feet. The course of the tunnel is south-east. The work is being pushed forward with great energy, and doubtless before long bodies of ore will be encountered to reward the projectors of this enterprise.

OTHER MINES.

There are a great many other mines in this district, some of which have produced largely in bullion, and some are still producing. There are a great many, too, on which an immense amount of work has been done, and some ore found, but as yet not in paying quantities. From Bullwhacker Flat to the summit of Prospect Mountain, the whole distance is lined with hoisting works and shafts. Several tunnels have been projected, and are being driven vigorously forward for the purpose of thoroughly exploring this great mineral belt from one end to the other, and doubtless rich developments will be soon made in some of these locations to reward the energy and perseverance of those engaged in prosecuting the work.

The recent litigation between the Eureka Consolidated and Richmond Companies, having decided some disputed points in regard to the location of mines in this district, as a matter of interest, the decision of the U. S. Circuit Court is given here in full:

JUDGE FIELD'S OPINION.

This is an action of ejectment for the possession of certain mining ground, particularly described in the complaint, situated in Eureka mining district, in the County of Eureka, in the State of Nevada. The

plaintiff is a corporation created under the laws of California, and the defendant, the Richmond Mining Company, is a corporation created under the laws of Nevada. The other defendants, Thomas Wren and Joseph Potts, are citizens of the latter State. The action was originally commenced in the State Court of Nevada, but upon application of the plaintiff, and upon the ground of its incorporation in another State, and presumed citizenship, from that fact, of its corporators or stockholders in that State, it was transferred to the Circuit Court of the United States. The complaint in the State Court, in addition to the usual allegations of a declaration in ejectment, set forth various grounds upon which was based a prayer for an order restraining the defendants from working the premises in controversy pending the action. The defendants, in their answer to the complaint, not only denied the title of the plaintiff, but made various averments upon which a like restraining order against the plaintiff was asked. Both orders were granted. This union of a demand in ejectment for the property in controversy with a prayer for provisional equitable relief, is permitted by the system of procedure which obtains in the State, thus saving the parties the necessity of litigating in two suits, what can as readily, and less expensively, be accomplished in one. But this union is not permitted in the Federal Courts; and upon the transfer of the present action, the pleadings of the plaintiff were amended, by substituting a regular complaint in ejectment on the law side of the Court; and a bill was filed for an injunction on its equity side. The defendants answered both, and also filed a cross-bill for an injunction against the plaintiff.

By arrangement of the parties, the defendants, Messrs. Wren and Potts, are dropped out of the controversy, and their names may be stricken from the pleadings. The claim for damages is also waived in this action, without prejudice to any future proceedings with respect to them. By stipulation, the case at law, the action of ejectment, is tried by the Court without the intervention of a jury, and the judges sit at San Francisco, instead of Carson, their finding and judgment to be entered in term time in the latter place as though the case were heard and decided there. The testimony taken in the action at law is to be received as depositions in the equity suit, and both cases are to be disposed of at the same time, to the end that the whole controversy between the parties may be settled at once.

The premises in controversy are of great value, amounting by estimation to several hundred thousands of dollars, and the case has been prepared for trial with a care proportionate to this estimate of the value of the property; and the trial has been conducted by counsel on both sides with eminent ability.

Whatever could inform, instruct or enlighten the court, has been presented by them. Practical miners have given us their testimony as to the location and working of the mine. Men of science have explained to us how it was probable that nature in her processes had deposited the mineral where it is found. Models of glass have made the hill, where the mining ground lies, transparent, so that we have been able to trace the course of the veins, and see the chambers of ore found in its depths. For myself, after a somewhat extended judicial experience, covering now a period of nearly twenty years, I can say that I have seldom, if ever, seen a case involving the consideration of so many and varied particulars, more thoroughly prepared or more ably presented. And what has added a charm to the whole trial has been the conduct of counsel on both sides, who have appeared to assist each other in the development of the facts of

the case, and have furnished an illustration of the truth that the highest courtesy is consistent with the most earnest contention.

The mining ground which forms the subject of controversy is situated in a hill known as Ruby Hill, a spur of Prospect Mountain, distant about two miles from the town of Eureka in Nevada. Prospect Mountain is several miles in length, running in a northerly and southerly course. Adjoining its northerly end is this spur called Ruby Hill, which extends thence westerly or in a south-westerly direction. Along and through this hill for a distance slightly exceeding a mile, is a zone of limestone in which, at different places throughout its length, and in various forms, mineral is found, this mineral appearing sometimes in continuous veins, sometimes in apparently isolated chambers, and at other times in what would seem to be scattered grains. And our principal inquiry is to ascertain the character of this zone, in order to determine whether it is to be treated as constituting one lode, or as embracing several lodes, as that term is used in the acts of congress of 1866 and 1872, under which the parties have acquired whatever rights they possess. In this inquiry the first thing to be settled is the meaning of the term in those acts. This meaning being settled, the physical characteristics and the distinguishing feature of the zone will be considered.

Those acts give no definition of the term. They use it always in connection with the term vein. The act of 1866 provided for the acquisition of a patent by any person or association of persons claiming "a vein or lode of quartz, or other rock in place, bearing gold, silver, cinnabar or copper." The act of 1872 speaks of veins or lodes of quartz, or other rock in place, bearing similar metals or ores. Any definition of the term should, therefore, be sufficiently broad to embrace deposits of the several metals or ores here mentioned. In the construction of statutes, general terms must receive that interpretation which will include all the instances enumerated as comprehended by them. The definition of a lode given by geologists is that of a fissure in the earth's crust filled with mineral matter; or, more accurately, as aggregations of mineral matter containing ores in fissures. (See Von Cotta's *Treatise on Ore Deposits*, Prime's Translation, 26.) But miners used the term before geologists attempted to give it a definition. One of the witnesses in this case, Dr. Raymond, who, for many years, was in the service of the general government as commissioner of mining statistics, and in that capacity had occasion to examine and report upon a large number of mines in the States of Nevada and California, and the Territories of Utah and Colorado, says that he has been accustomed as a mining engineer to attach very little importance to those cases of classification of deposits, which simply involve the referring of the subject back to verbal definitions in the books. The whole subject of the classification of mineral deposits he states to be one in which the interests of the miner have entirely overridden the reasonings of the chemists and geologists. "The miners," to use his language, "made the definition first. As used by miners, before being defined by any authority, the term lode simply meant that formation by which the miner could be led or guided. It is an alteration of the verb lead; and whatever the miner could follow, expecting to find ore, was his lode. Some formation within which he could find ore, and out of which he could not expect to find ore, was his lode." The term lode-star, guiding-star, or north-star, he adds, is of the same origin. Cinnabar is not found in any fissure of the earth's crust, or in any lode as defined by geologists, yet the acts of Congress speak, as already seen, of lodes of quartz, or rock in place bearing cinnabar. Any definition of lode, as there used, which did not embrace

deposits of cinnabar, would be as defective as if it did not embrace deposits of gold or silver. The definition must apply to deposits of all the metals named, if it apply to a deposit of any one of them. Those acts were not drawn by geologists or for geologists; they were not framed in the interests of science, and consequently with scientific accuracy in the use of terms. They were framed for the protection of miners in the claims which they had located and developed, and should receive such a construction as will carry out this purpose. The use of the terms vein and lode in connection with each other in the act of 1866, and their use in connection with the term ledge in the act of 1872, would seem to indicate that it was the object of the legislator to avoid any limitation in the application of the acts which a scientific definition of any of these terms might impose.

It is difficult to give any definition of the term as understood and used in the acts of Congress which will not be subject to criticism. A fissure in the earth's crust, an opening in its rocks and strata made by some force of nature, in which the mineral is deposited, would seem to be essential to the definition of a lode in the judgment of geologists. But to the practical miner, the fissure and its walls are only of importance as indicating the boundaries within which he may look for and reasonably expect to find the ore he seeks. A continuous body of ore lying within any other similar well-defined boundaries on the earth's surface, and under it, would equally constitute in his eyes a lode. We are of opinion, therefore, that the term, as used in the acts of Congress, is applicable to any zone or belt of mineralized rock lying within boundaries clearly separating it from the neighboring rock. It includes, to use the language cited by counsel, all deposits of mineral matter found through a mineralized zone or belt coming from the same source, impressed with the same forms, and appearing to have been created by the same processes.

Examining, now, with this definition in mind, the features of the zone which separate and distinguish it from the surrounding country, we experience little difficulty in determining its character. We find that it is contained within clearly defined limits, and that it bears unmistakable marks of originating, in all its parts, under the influence of the same creative forces. It is bounded on the south side, for its whole length, at least so far as explorations have been made, by a wall of quartzite of several hundred feet in thickness; and on its north side, for a like extent, by a belt of clay or shale, ranging in thickness from less than an inch to seventy or eighty feet. At the east end of the zone, in the Jackson mine, the quartzite and shale approach so closely as to be separated by a bare seam less than an inch in width. From that point they diverge, until on the surface, in the Eureka mine, they are about five hundred feet apart, and on the surface, in the Richmond mine, about eight hundred feet. The quartzite has a general dip to the north, at an angle of about forty-five degrees, subject to some local variations as the course changes. The clay or shale is more perpendicular, having a dip at an angle of about eighty degrees. At some depth under the surface, these two boundaries of the limestone, descending at their respective angles, must come together. In some of the levels worked they are now only from two hundred to three hundred feet apart.

The limestone found between these two limits—the wall of quartzite and the seam of clay or shale—has, at some period of the world, been subjected to some dynamic force of nature, by which it has been broken up, crushed, disintegrated and fissured, in all directions, so as to destroy, except in three or four places of a few feet each, so far as explorations

show, all traces of stratification; thus specially fitting it, according to the testimony of the men of science, to whom we have listened, for the reception of the mineral which, in ages past, came up from the depths below in solution, and was deposited in it. Evidence that the whole mass of limestone has been, at some period, lifted up and moved along the quartzite, is found in the marks of attrition engraved on the rock. This broken, crushed and fissured condition pervades, to a greater or less extent, the whole body, showing that the same forces which operated upon a part, operated upon the whole, and at the same time. Wherever the quartzite is exposed, the marks of attrition appear. Below the quartzite no one has penetrated. Above the shale the rock has not been thus broken and crushed. Stratification exists there. If in some isolated places there is found evidence of disturbance, that disturbance has not been sufficient to affect the stratification. The broken, crushed and fissured condition of the limestone gives it a specific, individual character by which it can be identified and separated from all other limestone in the vicinity.

In this zone of limestone numerous caves or chambers are found, further distinguishing it from the neighboring rock. The limestone being broken and crushed up as stated, the water from above readily penetrated into it, and operating as a solvent, formed these caves and chambers. No similar cavities are found in the rock beyond the shale, its hard and unbroken character not permitting, or at least opposing, such actions from the water above.

Oxide of iron is also found in numerous places throughout the zone, giving to the miner assurance that the metal he seeks is in its vicinity.

This broken, crushed and fissured condition of the limestone, the presence of the oxides of iron, the caves or chambers we have mentioned, with the wall of quartzite and seam of clay bounding it, give to the zone, in the eyes of the practical miner, an individuality—a oneness as complete as that which the most perfect lode in a geological sense ever possessed. Each of the characteristics named, though produced at a different period from the others, was undoubtedly caused by the same forces operating at the same time upon the whole body of the limestone.

Throughout this zone of limestone, as we have already stated, mineral is found in the numerous fissures of the rock. According to the opinions of all the scientific men who have been examined, this mineral was brought up in solution from the depths of the earth below, and would, therefore, naturally be very irregularly deposited in the fissures of the crushed matter, as these fissures are in every variety of form and size, and would also find its way in minute particles in the loose material of the rock. The evidence shows that it is sufficiently diffused to justify giving to the limestone the general designation of mineralized matter—metal-bearing rock. The three scientific experts produced by the plaintiff, Mr. Keyes, Mr. Raymond and Mr. Hunt, all of them of large experience and extensive attainments, and two of them of national reputation, have given it as their opinion, after examining the ground, that the zone of limestone between the quartzite and shale constitute one vein or lode, in the sense in which those terms are used by miners. Mr. Keyes, who for years was superintendent of the mine of the plaintiff, concludes a minute description of the character and development of the ground, by stating that, in his judgment, according to the customs of miners in this country and common sense, the whole of that space should be considered and accepted as a lead, lode or ledge of metal-bearing earth, or rock in place.

Dr. Raymond, after giving a like extended account of the character

of the ground, and his opinion as to the causes of its formation, and stating with great minuteness the observations he had made, concludes by announcing as his judgment, after carefully weighing all that he had seen, that the deposit between the quartzite and shale is to be considered as a single vein in the sense of the word in which it is used by miners—that is, as a single ore deposit of identical origin, age and character throughout.

Dr. Hunt, after stating the result of his examination of the ground and his theory as to the formation of the mine, gives his judgment as follows:

“My conclusion is this: That this whole mass of rock is impregnated with ore; that although the great mass of ore stretches for a long distance above horizontally and along an incline down the foot wall, as I have traced it, from this deposit you can also trace the ore into a succession of great cavities or bonanzas lying irregularly across the limestone, and into smaller caverns or chasms of the same sort; and that the whole mass of the limestone is irregularly impregnated with the ore. I use the word impregnation in the sense that it has penetrated here and there; little patches and stains, ore vugs and caverns and spaces of all sizes and all shapes, irregularly disseminated through the mass. * * * I conclude, therefore, that this great mass of ore is, in the proper sense of the word, a great lode, or a great vein, in the sense in which the word is used by miners; and that practically the only way of utilizing this deposit is to treat the whole of it as one great ore-bearing lode or mass of rock.”

This conclusion as to the zone constituting one lode of rock bearing metal, it is true, is not adopted by the men of science produced as witnesses by the defendant, the Richmond Company. These latter gentlemen, like the others, have had a large experience in the examination of mines, and some of them have acquired a national reputation for their scientific attainments. No one questions their learning or ability, or the sincerity with which they have expressed their convictions. They agree with the plaintiff's witnesses as to the existence of the mineralized zone of limestone with an underlying quartzite and an overlying shale; as to the broken and crushed condition of the limestone, and substantially as to the origin of the metal and its deposition in the rock. In nearly all other respects they disagree. In their judgment, the zone of limestone has no features of a lode. It has no continuous fissure, says Mr. King, to mark it as a lode. A lode, he adds, must have a foot wall, and a hanging wall, and if it is broad, these must connect at both ends, and must connect downward. Here there is no hanging wall or foot wall; the limestone only rests as a matter of stratigraphical fact on underlying quartzite, and the shale overlies it. And distinguishing the structure at Ruby Hill from the Comstock lode, the same witness says that the one is a series of sedimentary beds laid down in the ocean and turned up; the other is a fissure extending between two rocks.

The other witnesses of the defendant, so far as they have expressed any opinion as to what constitutes a lode, have agreed with the views of Mr. King. It is impossible not to perceive that these gentlemen at all times carried in their minds the scientific definition of the term as given by geologists, that a lode is a fissure in the earth's crust filled with mineral matter, and disregarded the broader, though less scientific, definition of the miner, who applies the term to all zones or belts of metal-bearing rock lying within clearly marked boundaries. For the reasons already stated, we are of opinion that the Act of Congress uses the term in the sense in which miners understand it.

If the scientific definition of a lode, as made by geologists, could be accepted as the only proper one in this case, the theory of distinct veins existing in distinct fissures of the limestone would be not only plausible, but reasonable; for that definition is not met by the conditions in which the Eureka mineralized zone appears. But as that definition cannot be accepted, and does not meet the case of a lode, as that term is understood by miners, the theory of separate veins, as distinct and disconnected bodies of ore, falls to the ground. It is, therefore, of little consequence what name is given to the veins in the limestone, whether they be called pipe veins, rake veins or pipes of ore, or receive the new designation suggested by one of the witnesses, they are but parts of one greater deposit, which permeates, in a greater or less degree, with occasional intervening spaces of barren rock, the whole mass of limestone, from the Jackson mine to the Richmond, inclusive.

The acts of Congress of 1866 and 1872 dealt with a practical necessity of miners; they were drawn to protect locations on veins or lodes, as miners understood those terms. Instances without number exist, where the meaning of words in a statute has been enlarged or restricted and qualified, to carry out the intention of the legislature. The inquiry, where any uncertainty exists, always is as to what the legislature intended, and when that is ascertained it controls. In a recent case before the Supreme Court of the United States, singing birds were held not to be live animals, within the meaning of a revenue act of Congress. (*Reiche v. Smythe*, 13 Wall. 162.) And in a previous case, arising upon the construction of the Oregon donation act of Congress, the term, a single man, was held to include in its meaning an unmarried woman. (*Silver v. Ladd*, 7 Wall. 219.) If any one will examine the two decisions, reported as they are in Wallace's Reports, he will find good reasons for both of them.

Our judgment being that the limestone zone in Ruby Hill, in Eureka District, lying between the quartzite and shale, constitutes, within the meaning of the act of Congress, one lode of rock bearing metal, we proceed to consider the rights conveyed to the parties by their respective patents from the United States. All these patents are founded upon previous locations, taken up and improved according to the customs and rules of miners in the district. Each patent is evidence of a perfected right in the patentee to the claim conveyed, the initiatory step for the acquisition of which was the original location. If the date of such location be stated in the instrument the patent will take effect by relation, as of that date, so far as may be necessary to cut off all intervening claimants, unless the prior right of the patentee, by virtue of his earlier location, has been lost by a failure to contest the claim of the intervening claimant, as provided in the act of 1872. As in the system established for the alienation of the public lands, the patent is the consummation of a series of acts, having for their object the acquisition of the title; the general rule is to give to it an operation by relation at the date of the initiatory step, so far as may be necessary to protect the patentee against subsequent claimants to the said property. As was said by the Supreme Court, in the case of *Shepley v. Cowan*, 1 Otto, 338, where two parties were contending for the same property, the first in time, in the commencement of proceedings for the acquisition of the title, when the same are regularly followed up, is deemed to be the first in right.

But this principle has been qualified in its application to patents of mining ground, by provisions in the act of 1872, for the settlement of adverse claims before the issue of the patent. Under that act, when one is seeking a patent for his mining location, and gives proper notice of the

fact, as there prescribed, any other claimant of an unpatented location, objecting to the patent of the claim, either on account of its extent or form, or because of asserted prior location, must come forward with his objections and present them, or he will afterward be precluded from objecting to the issue of the patent. While, therefore, the general doctrine of relation applies to mining patents so as to cut off intervening claimants, if any there can be, deriving title from other sources, such, perhaps, as might arise from a subsequent location of school warrants, or a subsequent purchase from the State, as in the case of *Heydenfeldt v. Daney Gold Mining Company*, reported in the third of Otto; the doctrine cannot be applied so as to cut off the rights of the earlier patentee, under a later location, where no opposition to that location was made under the statute. The silence of the first locator is, under the statute, a waiver of his priority.

But, from the view we take of the rights of the parties under their respective patents and the locations upon which those patents were issued, the question of priority of location is of no practical consequence in the case.

The plaintiff is the patentee of several claims on the Ruby Hill lode, but for the purpose of this action it is only necessary to refer to three of them—the patents for the Champion, the At Last and the Lupita or Margaret claims. The first of these patents was issued in 1872, the second in 1876, and the third in 1877. Objection is taken to the validity of the last two, because the end lines of the surface locations patented are not parallel, as required by the act of 1872. But to this objection there are several obvious answers. In the first place, it does not appear upon what locations the patents issued. They may have been, and probably were, issued upon locations made under the act of 1866, where such parallelism in the end lines of the surface locations was not required.

The presumption of the law is, that the officers of the executive department specially charged with the supervision of applications for mining patents, and the issue of such patents, did their duty; and in an action of ejectment, mere surmises to the contrary will not be listened to. If, under any possible circumstances, a patent for a location without such parallelism may be valid, the law will presume that such circumstances existed. A patent of the United States for land, whether agricultural or mineral, is something upon which its holder can rely for peace and security in his possessions. In its potency it is iron-clad against all mere speculative inferences. In the second place, the provision of the statute of 1872, requiring the lines of each claim to be parallel to each other, is merely directory, and no consequence is attached to a deviation from its direction. The essential point was to secure parallel end lines drawn vertically down, and that was done by taking the extreme points of the respective locations on the length of the lode. In the third place, the defect objected to does not affect the defendant, and no one but the Government has the right to complain.

The defendant, The Richmond Mining Company, also holds several patents issued to it upon different locations; but in this case it specially relies upon the patents of the Richmond and Tip Top claims. These patents were issued upon locations made in 1869, which is earlier than any of the locations upon which the patents to the plaintiff were issued, at least so far as we are informed. Upon this fact, and claiming from it that the patents antedate in their operation, by relation, back to their respective locations the patents under which the plaintiff claims, and the further fact that the patents were issued upon locations made in 1866, the

defendant relies to defeat the pretensions of the plaintiff. It contends that, inasmuch as the croppings of the vein it works are within the surface of its patented locations, it can follow the vein wherever it leads, though it be outside of the end lines of the locations when vertically drawn down the lode. Its position is that whenever, under the law of 1866, a location was made on a lode or vein, a right was acquired to follow the vein wherever it might lead, without regard to the end lines of the location. This position is urged with great persistence by one of the counsel of the defendant, and with the ability which characterizes all his discussions.

The second section of the act of 1866, upon the provisions of which this position is based provides: "That whenever any person or association of persons claims a vein or lode of quartz, or other rock in place, bearing gold, silver, cinnabar or copper, having previously occupied and improved the same according to local customs or rules of miners in the district where the same is situated, and having expended, in actual labor and improvements thereon, an amount of not less than one thousand dollars, and in regard to whose possession there is no controversy or opposing claim, it shall and may be lawful for said claimant, or association of claimants, to file in the local land-office a diagram of the same, so extended, laterally or otherwise, as to conform to the local laws, customs and rules of miners, and to enter such tract and receive a patent therefor, granting such mine, together with the right to follow such vein or lode, with its dips, angles and variations, to any depth, although it may enter the land adjoining, which land adjoining shall be sold subject to this condition."

It will be seen by this section that to entitle a party to a patent, his claim must have been occupied and improved according to the local customs or rules of miners of the district, and that his diagram of the same, filed in the land-office, in its extension, laterally or otherwise, must be in conformity with them.

The rules of the miners in the Eureka Mining District, adopted in 1865—*Laws of the District*, as they are termed by the miners—provided that claims of mining ground should be made by posting a written notice on the claimant's ledge, defining its boundaries if possible; that each claim should consist of two hundred feet on the ledge, but claimants might consolidate their claims by locating in a common name, so that in the aggregate no more ground was claimed than two hundred feet for each name, and that each locator should be entitled to all dips, spurs and angles connecting with his ledge; and that a record of all claims should be made within ten days from the date of location. The rules also allowed claimants to hold one hundred feet each side of their ledge for mining and building purposes, but declared that they should not be entitled to any other ledge within this surface.

It will be perceived by these rules that they had reference entirely to locations of claims on ledges. It would seem that the miners of the district then supposed that the mineral in the district was only found in veins or ledges, and not in isolated deposits. In February, 1869, new rules were added to those previously passed, authorizing the location of such deposits. These new rules provided that each deposit claim should consist of one hundred feet square, and that the location should take all the mineral within the ground to any depth.

In September, 1869, under these rules, square locations and linear locations were made by parties through whom the defendant derives title on what is called the Richmond ledge, and linear locations were made on

what is called the Tip Top ledge, with surface locations for mining purposes, both parties claiming with their locations all dips, spurs and angles. It is only of the linear locations we have occasion to speak; it is under them that the defendant asserts title to the premises in controversy.

Now, as neither the rules of miners in Eureka Mining District nor the act of 1866, in terms, speak of end lines to locations made on ledges, nor in terms impose any limitation upon miners following these veins wherever they may lead, it is contended that no such limitation can be considered as having existed and be enforced against the defendant. The Act of 1866, it is said, recognizes the right of the locator to follow his vein outside of any end lines drawn vertically down when it permits him to obtain a patent granting his mine, "together with the right to follow such vein or lode with its dips, angles and variations to any depth, although it may enter the land adjoining, which land adjoining shall be sold subject to this condition."

It is true that end lines are not in terms named in the rules of the miners; but they are necessarily implied; and no reasonable construction can be given to them without such implication. What the miners meant by allowing a certain number of feet on a ledge was, that each locator might follow his vein for that distance on the course of the ledge, and to any depth within that distance. So much of the ledge he was permitted to hold for the working of his vein as could be measured in its width anywhere by the feet on the surface. If this were not so, he might by the bend of his vein hold under the surface, along the course of the ledge, double or treble the amount he could take on the surface. Indeed, instead of being limited by the number of feet prescribed by the rules, he might in some cases oust all his neighbors and take the whole ledge. No construction is permissible which would substantially defeat the limitation of quantity on a ledge, which was the most important provision in the whole system of rules.

Similar rules have been adopted in numerous mining districts, and the construction thus given has been uniformly and everywhere followed. We are confident that no other construction has ever been adopted in any mining district in California or Nevada. And the construction is one which the law would require in the absence of any construction by miners. If, for instance, the State were to-day to deed a block in the city of San Francisco to twenty persons, each to take twenty feet front, in a certain specified succession, each would have assigned to him, by the law, a section parallel with that of his neighbor of twenty feet in width cut through the block. No other mode of division would carry out the grant.

The act of 1866 in no respect enlarges the right of the claimant beyond that which the rules of the mining district gave him. The patent which the act allows him to obtain does not authorize him to go outside of the end lines of his claim, drawn down vertically through the ledge or lode. It only authorizes him to follow his vein, with its dips, angles and variations to any depth, although it may enter land adjoining; that is, land lying beyond the area included within his surface lines. It is land lying on the side of the claim, not on the ends of it, which may be entered. The land on the ends is reserved for other claimants to explore. It is true as stated by the defendant, that the surface land taken up in connection with a linear location on the ledge or lode is, under the act of 1866, intended solely for the convenient working of the mine, and does not measure the miner's right either to the linear feet upon its course, or

to follow the dips, angles and variations of the vein, or control the direction he shall take. But the line of the location taken does measure the extent of the miner's right. That must be along the general course or strike, as it is termed, of the ledge or lode. Lines drawn vertically down at right angles, with a line representing this general course, at the ends of the claimant's line of location, will carve out, so to speak, a section of the ledge or lode within which he is permitted to work, and out of which he cannot pass.

As the act of 1866 requires the applicant for a patent to file in the local office a diagram of his claim, such diagram must necessarily present something more than the mere linear location. It is intended that it should embrace the surface claimed for the working of the mine. In this way the patent of the Richmond claim embraces three acres and a fraction of an acre of surface ground, and five hundred and a half linear feet on the lode. And the patent of the Tip Top embraces nearly four acres of surface ground and six hundred linear feet on the lode.

The Act of 1872 preserves to the miner the right acquired under the Act of 1866, and confers upon him additional rights. Under the Act of 1866 he could only hold one lode, or vein, although more than one appeared within the lines of his surface location. The surface ground was allowed him for the convenient working of the lode or vein located, and for no other purpose. It conferred no right to any other lode or vein. But the Act of 1872 alters the law in this respect. It grants to him the exclusive right of possession to a quantity of surface ground, not exceeding a specified amount, and not only the particular lode or vein located, but all other veins, lodes, and ledges, the top or apex of which lies within the surface lines of his location, with the right to follow such veins, lodes or ledges to any depth. But these additional rights are granted subject to the limitation that in following the veins, lodes or ledges, the miner shall be confined to such portions thereof as lie between vertical planes drawn downward through the end lines of his location, and a further limitation upon his right in cases where two or more veins intersect or cross each other. The Act in terms annexes these conditions to the possession not only of claims subsequently located, but to the possession of those previously located. This fact, taken in connection with the reservation of all rights acquired under the Act of 1866, indicates that in the opinion of the Legislature, no change was made in the rights of previous locators by confining their claims within the end lines. The Act simply recognized a pre-existing rule, applied by miners to a single vein or lode of the locator, and made it applicable to all veins or lodes found within the surface lines.

Our opinion, therefore, is that both the defendant and the plaintiff, by virtue of their respective patents, whether issued upon locations under the Act of 1866, or under the Act of 1872, could only follow the veins or lodes lying within lines drawn vertically downward at the end of their respective locations, and that each took the ores found in all veins or lodes, the apex or top of which lay within those lines.

The question of priority of location is, therefore, as already stated, of no practical importance in the case. This question can only be important where the lines of one patent overlaps those of another patent. Here, neither plaintiff nor defendant could pass outside of the end lines of its own locations, whether they were made before or after those upon which the other party relies. And inasmuch as the ground in dispute lies within the end lines of the plaintiff's patented locations drawn ver-

HUMBOLDT COUNTY.

This county shows a marked increase in its prosperity since my last report. More attention has been given to mining than formerly, and new districts of promise have been discovered. Being one of the largest counties in the State there is found a great diversity of soil and productions. The great fertility of many of the foot-hills and valleys forms a pleasing contrast with the extreme barrenness exhibited by its sandy deserts and alkali flats. The mountain ranges in general, with a northerly and southerly trend, give direction and character to the valleys which they inclose, and the passes between, sometimes steep and rough, again are often smooth and of easy grade. The southern section of the county was early considered one of the richest parts of Nevada. It was extensively prospected and much mineral wealth was produced. Several parallel ranges of mountains, bounded on the west and north by the Humboldt river, afforded a good field for prospecting, and numerous districts were organized. Wherever indications of ore were found a location was made. The western section, bounded by the Humboldt Sink and Mud and Pyramid Lakes, is one of the most barren portions of the State. The alkali flats, and dry and sandy wastes, render it almost useless for the purposes of man. But even here mining districts have been located. The northern section is characterized by lofty basaltic table lands and deep ravines, with rugged and precipitous sides. There is but little timber or vegetation in the west, and the large areas sunk below the general level of the plateau contain lakes, the waters of which are strongly impregnated with salt, soda, magnesia and other mineral substances. The north-eastern section was for a long time unexplored. Apart from the extent of its valuable agricultural lands in Paradise Valley, but little was known of its resources. But the recent discoveries have given a fresh impetus to prospecting in this direction, and in the future better results are expected than any which have yet been obtained.

At no time have the agricultural interests of this county been in a more prosperous condition than at present. The fertile lands in Paradise Valley, about the sink of Weatherlow creek, and along such streams as the Humboldt and Umashan and Wheeler creek have produced large quantities of grain and hay, and the fruits and vegetables of a temperate climate produced here, have been of the most excellent quality. The native grasses of the foot-hills and mountains have given sustenance to large herds of cattle and flocks of sheep, and stock-raising has become one of the most important elements in the resources of the county.

The area of the agricultural land is estimated at twenty thousand acres, but in the future, when water shall be more abundantly supplied by means of irrigating ditches and artesian wells, this estimate will be largely increased. At present there is a general mining revival in this

county. Never before has the work of prospecting been more vigorously prosecuted, and the discovery of new districts in sections heretofore unexplored has given increased activity to all branches of trade. During the year 1877, the gross yield of the mines in this county was three hundred and seven thousand two hundred and twenty-four dollars. Of this amount, one hundred and forty-four thousand two hundred and sixty dollars was from the Rye Patch Company's mines. The Central Pacific Railroad furnishes great facilities for the transportation of the products, and the supplies needed from abroad. Nine hundred and sixty-three votes were cast at the last general election.

BUENA VISTA DISTRICT.

The great quantity of low-grade ore found in the Arizona Mine still continues to supply the mills at Unionville with a limited amount that will pay for working. Lately the ore is found to be getting richer, and as new developments are made, the indications are much better than they have been for a long time that new bodies of rich ore will be discovered. The Arizona is the chief mine in the district, and the only one in which work to any great extent has been done for several years.

Buena Vista District was organized in 1861; but the Arizona was not discovered until the following year. It was some time after this before the developments were made of the rich ore which for a time made this mine so famous. For several years the Arizona was the leading mine in Humboldt County. It has produced, during the time it has been worked, more bullion than has been taken from all the other mines in Humboldt County. Water was encountered at a depth of eighty feet. The country rock in which the vein is found is limestone. The depth reached in the lowest working of this mine does not exceed four hundred feet, and at this depth the indications for its continuing downwards for an indefinite distance are as encouraging as they ever were. The vein crops out near the summit on the western slope of a very precipitous mountain, thus affording a good opportunity for opening the mine at a great depth by means of a tunnel.

Starting in the canon, near the tramway dump, a tunnel, driven a distance of about thirteen hundred feet, would cut the vein at a depth of twelve hundred feet. The bullion yield of the Arizona for the years, beginning with 1871 and ending with 1877, was:

1871. Three hundred and thirty-nine thousand eight hundred and eight dollars and twelve cents.

1872. Three hundred and twenty-six thousand five hundred and thirty dollars and eighty-nine cents.

1873. Two hundred and forty-four thousand six hundred and twenty dollars and fifty-seven cents.

1874. One hundred and seventy-two thousand seven hundred and thirty dollars and seventy-eight cents.

1875. Seventy-eight thousand nine hundred and forty-four dollars.

1876. Sixty thousand seven hundred and twenty-seven dollars and twenty-two cents.

1877. Seventy-eight thousand eight hundred and seventy-seven dollars.

A total of one million three hundred and two thousand two hundred and thirty-eight dollars and fifty-eight cents.

The present encouraging outlook at this mine is full of promise for the future, and furnishes a probability that mining operations will again be as prosperous as in the past.

STAR DISTRICT.

This is one of the oldest districts in Humboldt County, and several years ago was the leading mining camp. The ores obtained near the surface were exceedingly rich, but base, and difficult to be worked. The ore was found in deposits, and the vein much broken up. Water was encountered at no great depth, and soon it was found that the ore deposits were not as extensive as anticipated; so the district was almost abandoned for a long time. Work has been resumed at different times on some of the claims; but, with the exception of the Sheba, not a great deal of work has been done on any of the veins since the first stampede was made.

A Krom concentrator was built here a few years ago to operate on the low grade ores of the district. The mill works well, but sufficient ore cannot be obtained to keep it in constant operation. It has produced about one thousand tons concentrations during the past two months, of ore obtained from the Sheba and Grizzly mines.

SHON DISTRICT.

This district is situated in the range of mountains to the west of Paradise Valley. It is about twenty-seven miles north of Winnemucca, and not far from the Idaho stage road. The Eclipse is one of the principal locations, ore from which has given assays of upwards of five hundred dollars per ton. Immense quantities of float ore cover the surface of the ground in the vicinity of the Eclipse. Many prospectors are now in this district, and a number of locations have been recently made. The veins are found in granite, three of which are silver-bearing, and run parallel. Barren veins of quartz are found higher up on the mountain.

BOLIVIA DISTRICT.

This district is situated south of Unionville, on the eastern slope of the Table Mountain. Most of the locations have been made for copper.

An extensive mineral belt is found in this district, which extends for a long distance further south. The veins which are well defined show some exceedingly high-grade ores, consisting of red sulphuret and carbonate of copper. Recently some very rich silver ore has been found in the Linda Jo. Five and a half tons taken to Winnemucca give assays of three thousand dollars; and it is estimated that the whole amount will yield nearly one thousand dollars per ton. The vein is about five feet in width, one foot of which yields this remarkable ore. A shaft has been sunk in the vein a depth of sixteen feet.

WINNEMUCCA DISTRICT.

Work has been resumed on a number of the locations in this district, and some recent discoveries have been made. This district is situated only a short distance from the town of Winnemucca, on the mountain which rises on the north side of the Humboldt river. The Fairmount Mill and Mining Company was incorporated during the past summer, a mill has been erected, a large amount of work has been done in the Fairmount Mine, and several hundred tons of ore extracted. Coll Dave Buell, so well and favorably known as an energetic and successful manager, has charge of the Fairmount Company's property. The Beaconsfield Mine, lately discovered in this district, shows a vein five feet in width. It is one of the largest and richest veins in Winnemucca Mountain. The ore is principally a carbonate of lead, which carries from one hundred to two hundred dollars per ton in silver.

TRINITY DISTRICT.

Some work has been done lately in this district, which is situated about eight miles north-west of Oreana. It is one of the earliest located districts in the county. Work has been resumed in the Evening Star Mine. This vein is three feet in width, the ore from which averages sixty-five dollars per ton and is a black sulphuret with the chloride of silver. Water is reached at a depth of two hundred feet, and below this point little work has been done. In the early days of this district the Evening Star was worked quite extensively; a mill was built near the mine; but when work was stopped it was removed to Oreana. This mine has recently been sold to a San Francisco company, and work, it is hoped, will be prosecuted with energy in the future.

ECHO DISTRICT.

For some time past work has been suspended in the Rye Patch Company's mines, on account of litigation, the Reese Gold and Silver Mining Company here having brought an action, in the District Court of Humboldt County, to recover possession of the Alpha Mine, and for two hundred and twenty-five thousand dollars damages. The Rye Patch Company own the Alpha, and also the Butte mines. The mill belonging to this Company has been kept running pretty steadily for several years past, and has produced considerable bullion. Nine dividends have been paid, which aggregate one hundred and twenty-seven thousand five hundred dollars. The total assessments levied by the Company amount to ninety-seven thousand five hundred dollars. The Rye Patch Consolidated is an incorporated company, and is listed on all the San Francisco Stock Boards.

MOUNT ROSE DISTRICT.

This district is situated in the mountain range which bounds Paradise Valley on the east, and although it was discovered about six years ago, but little was done toward its development until within the past few months.

The principal locations have been made on Silver Hill, near the north-western terminus of the valley. Several companies have been organized, and the work of development is now being pushed ahead with great energy on a number of locations. There is, perhaps, no district in the State where the natural advantages for mining, milling, etc., are so favorable.

The distance to Winnemucca, which is the shipping point from which all supplies of machinery, etc., for mining and milling are received, is about fifty miles.

Paradise is one of the most extensively cultivated valleys in the State. It is about forty-five miles in length by ten in width. Several large streams of water flow into it which afford an abundant supply for irrigation. The soil is rich and fertile and produces the most abundant crops of hay, grain and vegetables. For years flour has been shipped from this valley to all the railroad and mining towns in Eastern Nevada. Now that a market is had so much nearer for the products of the farms, a greater number of acres will be cultivated. Hundreds of claims have already been located, and the mountains are alive with prospectors. The veins are well defined and are inclosed by porphyry and granite walls. The ore is exceedingly rich and easily worked, carrying both gold and silver. The principal work has been done by the Paradise Valley Mining Company, whose locations embrace three thousand feet in the most promising vein which has yet been discovered. This vein cuts across the face of a steep mountain, thus affording a good opportunity for being opened by means of tunnels at the different levels. As far as opened the vein is about six feet in width. Large quantities of ore have already been extracted which will average two hundred dollars per ton, and there is

sufficient ore already in sight in the different openings which have been made to insure a profitable run for a mill as soon as one can be erected. At present the ore is being shipped for reduction. A ten stamp mill is now in course of construction by Mr. Torry, and will soon be ready to commence crushing the ores of this district.

The Paradise Mining Company is a California incorporation. The stock of the company has been listed in the San Francisco Stock Board. From present indications the Paradise mines will soon be adding largely to the bullion production of the State, and during the coming year a large addition to the population may be expected.

LANDER COUNTY.

There has been little change in the affairs of this county since my last report. No important developments or discoveries have been made. The yield of bullion has not been so great as in preceding years, but there has been an increase in the population. During the past summer the town of Austin was again flooded by one of those destructive cloudbursts, so prevalent in eastern Nevada. A large amount of property was destroyed, but soon the damage was repaired. The total amount of ore extracted during the year eighteen hundred and seventy-seven, was five thousand six hundred and fifty-nine tons, with a gross value of five hundred and ninety-five thousand eight hundred and twenty-eight dollars and ninety cents. Of this amount the Manhattan Company produced four thousand one hundred and forty-three tons, having a gross value of four hundred and eleven thousand and sixty-eight dollars. During the seven years ending with eighteen hundred and seventy-seven, there were produced in this county one hundred and twenty-seven thousand three hundred and fifty-six tons of ore, with a gross value of eight million eight hundred and sixty-one thousand two hundred and ninety-eight dollars. The largest yield was for the years eighteen hundred and seventy-one and eighteen hundred and seventy-two; but this includes the yield from the mines which are now in Eureka County. The assessed value of real estate for the year eighteen hundred and seventy-eight was five hundred and forty-five thousand seven hundred and fifty-four dollars, and that of the personal property was one million five hundred and fifty-nine thousand one hundred and sixty dollars. The estimated population of the county is thirty-six hundred, and the number of votes cast at the last election was one thousand and sixty-one. The approximate area of mineral land is five thousand acres, that of the timber land is eight thousand eight hundred acres, that of the agricultural land is twelve thousand acres, and that of the grazing is nearly twice as much as the other amounts combined. Agriculture and stock raising have flourished; seventeen thousand three hundred acres of land are inclosed. Forty-seven thousand bushels of barley were raised in eighteen hundred and seventy-eight, besides several thousand bushels of wheat, oats and rye. Eleven hundred bushels of corn, and thirty thousand two hundred bushels of potatoes were produced in the same year, and thirteen thousand tons of hay were cut. During this year there were in the county twenty-four hundred horses and mules, twenty-one thousand head of cattle, and thirty-seven thousand sheep and lambs. The future prospects of the county for mining, agriculture and stock raising are encouraging.

REESE RIVER DISTRICT.

There has been a steady production of bullion from the mines belonging to the Manhattan Company during the past two years. The mill has been running, reducing on an average one hundred and twenty tons of ore every week, of the value of about one hundred and fifty dollars per ton. The principal portion of the ore has been taken from the Frost and Curtis shafts, though of late nearly one half has been custom and tribute ores. The ore obtained has not been as rich as in former years, and for the past two years the bullion yield has not been more than sufficient to defray the expense of mining and milling. No dividends have been paid since February, 1877. The first assessment ever levied by this Company was in October, 1878. The necessity for this assessment was occasioned by the depreciation of the value of silver, the lower grades of ore which have been worked, and the need of providing large quantities of mining supplies, of machinery, fuel, timbers, salt, etc., for use during the winter. Everything in and about the mill and hoisting works is in good condition. The mill has twenty stamps and a Stedefeldt furnace. The Company own, also, a Krom concentrating mill with a capacity for concentrating forty tons of ore per day. The Curtis shaft has reached a depth of eight hundred and twenty-five feet; through it are worked the Panamint and Allsop veins. Most of the ore being extracted is now extracted from the stopes above the five hundred and sixty level. The west drift is being run in very good ore. The east stope shows poorer ore, but a much larger vein. The Frost shaft is down eight hundred and seventy feet; through it is worked the Independence; the best ore bodies are found on the seven hundred and seventy foot level. This Company owns one hundred and twenty-six different locations in the district, and the area of mineral land secured by United States patent is one hundred and fifty-nine acres. Nearly all of the principal locations on Lander Hill now belong to the Manhattan Company. This district was discovered in 1862, and is the first one organized in eastern Nevada. Silver ore was first found in Pony Cañon by employees of the overland mail company. An immense emigration to Reese River followed soon after, and since that time the mines have been constantly worked. Much of the success in mining operations here during late years is due to the able management of the Manhattan Company. Many small companies whose properties were quite as valuable as those of the Manhattan have made but a meager showing in comparison with this Company. The total dividends declared amount to four hundred thousand dollars.

BATTLE MOUNTAIN DISTRICT.

Since my last report, mining operations in this district have not been pushed forward with much energy. A good deal of water is found in the mines, so that the work of prospecting is carried on with some difficulty after a depth of two hundred feet is reached. Although this is one of the oldest districts in the county, a greater depth than three hun-

dred feet has not been reached in any of the mines in the vicinity of Galena. There are a large number of claims on which a great amount of work has been done near the surface, and considerable bullion has been extracted. But until systematic explorations are made at greater depths, it is not probable that the production of ore will be increased much more than it has been for several years past. The veins found here are large and well defined, and all the indications are favorable for permanent mines. The mines at Galena are distant from the town of Battle Mountain, on the railroad, fifteen miles. Copper Canon is five miles south of Galena. Some work has been done on the White and Shiloh, and quite recently a valuable discovery of good ore has been made. A chamber of ore thirty feet long, six feet high, and three feet wide, it is thought, will yield seventeen thousand dollars. Work has also been done on the Trinity, and the present indications are that this mine will also begin to yield some good ore. New hoisting works are in course of construction by the Battle Mountain Company at Copper Canon, with power to sink to a depth of seven hundred feet. It is expected that these works will be ready for operation about the middle of January.

LEWIS DISTRICT.

This district is situated fourteen miles southeast from Battle Mountain. Considerable work has been done here during the past two years, and a good deal of bullion has been produced. The veins are found in limestone and quartzite, and vary in width from two to nine feet. The ore is found in chimneys, which pitch to the south. It yields from one hundred to one hundred and fifty dollars per ton, and contains a large per cent. of antimony, iron and manganese. The Eagle Consolidated Company have a good ten stamp mill, with roasting furnace, and own thirty-two hundred feet on the principal vein in the district. This mill has been running quite successfully at times during the past two years. The Starr and Grove mill has been overhauled, and the capacity of the roasting furnaces increased. It is kept running on the ores of the district.

LINCOLN COUNTY.

There has been a decrease in the bullion production of this county since the year 1874. The agricultural interests, on the other hand, have steadily advanced. In many of the valleys new and substantial improvements have been made, and some excellent crops have been obtained. Wheat, barley, oats, corn, potatoes, and other grains and vegetables grow in abundance where water for irrigation can be found; and the fruits and berries are of the most excellent and nutritious varieties. The approximate area of the agricultural land is estimated to be five times as great as that now under cultivation. Most of the hills and valleys afford some pasturage for stock, but on account of the scarcity of water, large tracts of grazing lands cannot be utilized. Most of the mountain ranges are seamed with mineral-bearing veins, and many productive mines have been developed. Doubtless, many others will be discovered. The estimated area of mineral lands in this county is three hundred thousand acres; and when this immense tract shall have been fully explored, there is little doubt but that more favorable results will be shown in the future than have been obtained in the past. The mineral product during the seven years ending with 1877 was three hundred and twenty-nine thousand seven hundred and fifty-three tons of ore, which has yielded bullion of the value of sixteen million eight hundred and twenty-eight thousand and forty-six dollars. About two thirds of this was produced during the years 1872, 1873 and 1874. During the latter year the greatest number of tons of ore was produced, about ninety-four thousand tons having been extracted. The average yearly production during the period was forty-seven thousand one hundred and eight tons, valued at two million four hundred four thousand and seven dollars. The average value of the ore per ton was fifty-one dollars and three cents. The product for the year 1877 was five hundred and fifty-six thousand and ninety-six dollars, or about two-thirds of the amount for the preceding year. For 1878 it was about the same as for 1877. There has been a slight increase in the population of this county during the last two years. Thirty-one more votes were polled at the last general election than were cast at the election in 1876. The assessed value of real estate for the last fiscal year was five hundred and seventy-six thousand two hundred and twenty-two dollars; and personal property, three hundred and fifty-four thousand seven hundred and ninety-five dollars, making the total value of taxable property nine hundred and thirty-one thousand and seventeen dollars. The estimated number of inhabitants is two thousand one hundred and ten, and the popular vote at the last general election was seven hundred and eighty-five.

ELY DISTRICT.

There has been little change in the prospects of this district during the past two years. The developments made by the Alps Company, in the Mazeppa Mine, and which for a time were so full of promise, were of little value. The property of this company has been sold at sheriff's sale. The bullion shipments for 1877 amounted to about six hundred thousand dollars, and for 1878 it was about the same.

During the past year the mill of the Meadow Valley Company at Dry Valley has been kept pretty constantly running on "tailings," some ore from the upper levels, and screenings from the old dumps. The hoisting works at No. 3 shaft have been repaired and put in good running order, and considerable ore has been taken from the second, fourth and seventh levels. This ore, after being screened and crushed at the mill, is mixed with the tailings. In this way a greater per cent. of silver is obtained from both the ore and tailings than if they were worked separately.

THE RAYMOND AND ELY

Still continues to be the leading mine of this district; and although its production of bullion during the past year has not been sufficient to defray all the expenses of the prospecting operations which have been carried on, there is yet great hope that the perseverance displayed here will be fully rewarded by the discovery of rich ore in the near future. The narrow-gauge railroad belonging to this company, and built at a cost of two hundred and fifty-five thousand two hundred and forty-nine dollars, has during the past year more than paid the expense of operating it, in carrying ore from the mines to mills in Dry Valley and at Bullionville. The bullion yield of this mine has been about ten million dollars, of which product three million and seventy-five thousand dollars have been paid in dividends to the stockholders, amounting to one hundred and two dollars and fifty cents per share.

Some of the Comstock mines have yielded more bullion, but not one of them has ever been remunerative to small shareholders.

The Black Ledge, an immense vein over thirty feet in width, was discovered about one year ago on the twelve hundred foot level of the Raymond and Ely. It was found at a distance of twelve hundred and fifty feet south-easterly from the main shaft. The ore is very base and mostly low grade, though some very high assays have been obtained, and it is thought that when another level has been opened a new bonanza will be found in the "Black Ledge." The latest official letter from this mine says: "Since last report we have made very fair progress. The winze is now eighty feet below the thirteen hundred foot level, water not quite as strong as usual. With good luck we will reach the fourteen hundred foot level on the 15th; will then cut out station, put in a large tank, run all the water down from thirteen hundred level, and use our No. 7 pump in forcing the water to twelve hundred level, where it will flow into the main shaft. Three hours work each day holds the water at a point from

twenty to thirty feet below station. On this (twelve hundred) level the east drift has been advanced during the week twenty-five feet in porphyry, hanging wall on south side showing ledge to good advantage; present length seventy-five feet. Will continue one hundred and twenty-five feet further—two hundred feet in all, provided the water does not increase as the rock becomes harder. At present the cost of labor in running the drift does not exceed six dollars per foot. Chlorides are doing fairly, and we are doing very well on the ninth and tenth levels in fair grade ore. Have run no cross-cuts as yet on thirteen hundred, and will not until fourteen hundred is open, for fear of too much water. The mills are running well."

The largest yield from this mine was in 1872, when twenty-eight thousand six hundred and thirty-six tons of ore were extracted, which gave three million six hundred and ninety-three thousand three hundred and ninety-four dollars, an average of one hundred and twenty-nine dollars per ton, and two million and seventy thousand dollars were paid in dividends to the stockholders, or sixty-nine dollars per share. This company owns two mills, a foundry, a railroad twenty-two miles in length and other property, all of which is valued at seven hundred and eighty-one thousand six hundred and sixty-four dollars. The total amount of assessments collected by the Raymond and Ely has been six hundred and thirty thousand dollars. The last dividend paid was in September, 1873. The work for 1878 is summarized in the annual reports of the Superintendent and Secretary given below:

SUPERINTENDENT'S REPORT.

Some time in February, 1878, it was decided to suspend all work on and below the twelve hundred level, until the necessary machinery for hoisting and pumping could be obtained and placed in position. As the greater part of it had to be ordered East and transported two hundred and fifty miles over almost impassable roads, more time was consumed in accomplishing the work than seemed actually necessary. However, about September 1, the machinery was put in motion, work resumed, and continued with but little interruption during the rest of the year.

A great deal of prospecting has been done in the old levels, and several tons of ore extracted, but no development of importance has been made. All the levels above the ninth are let on tribute to chloriders, who pay the company about thirty per cent. net. It may be well to explain that while the bullion shipments amount to two hundred and sixty-nine thousand one hundred and sixty-nine dollars and thirty-three cents, quite a large proportion of the amount was paid to chloriders and outside mine owners, to wit, sixty-six thousand eight hundred and ninety-nine dollars and twenty-two cents. You will perceive by reference to the Secretary's report, that the item of discount and freight is an important one; also that of bullion State and county tax, amounting to forty-six thousand one hundred and sixty-five dollars and fifty-six cents, leaving much less for legitimate expenses than one would suppose.

On the ninth and tenth levels considerable prospecting has been done; following veins of low-grade ore in expectation of finding something better.

The upraise from the tenth level follows a well-defined ledge of fair-grade ore, unlike anything ever before found in the mine, and carrying about fifty per cent. gold.

Very little has been done on the twelve hundred level, except at a point three hundred feet east of the main winze, where a drift was run in a northerly direction, to cut the Black ledge, and in the upraise which shows a large ledge of low-grade ore containing some that is very rich. As there is two hundred feet of unprospected ground above, there is good reason to believe something better will be found.

The main winze has attained a depth of two hundred and fifty feet below the twelve-hundred-foot level. Two new levels have been opened, viz., thirteen hundred and fourteen hundred. Two crosscuts have been run into ledge on former level, and one on the latter, all of which show a strong and well-defined vein. Some of it is very rich.

Lateral drifts are now being extended along the ledge on the lower level, and soon two more crosscuts will be run.

The water has been somewhat troublesome, but is now under perfect control.

In about forty days the winze will reach the fifteen-hundred-foot level, when, there is every reason to suppose, a genuine bonanza will be found.

The mills, machine-shop, foundry, hoisting-works, etc., are in perfect running order. A Cope & Maxwell pump, now on the way from San Francisco, together with those on hand, will enable the management here to prospect the Black ledge many hundreds of feet in depth.

SECRETARY'S REPORT.

Receipts.

| | |
|--|---------------------|
| Cash on hand January 1, 1878..... | \$ 15,946 36 |
| Gross bullion product..... | 269,169 33 |
| Ore sales..... | 3,714 22 |
| Sales of mine supplies..... | 1,162 92 |
| Sales of mill supplies..... | 1,509 84 |
| Outside milling..... | 19,810 71 |
| Railroad department..... | 4,536 36 |
| Machine shop and foundry..... | 4,569 02 |
| Assessment No. 7..... | \$30,000 |
| Assessment No. 8..... | 30,000 |
| Assessment No. 9..... | 30,000— 90,000 00 |
| Superintendent's drafts outstanding..... | 24,478 40 |
| Total..... | \$434,897 16 |

Disbursements.

| | |
|--|--------------------|
| Indebtedness last annual meeting..... | \$ 766 46 |
| Dead work | 46,793 00 |
| Ore extraction | 19,041 08 |
| Mine incidental expenses account..... | 5,058 27 |
| Mine salaries | 8,900 00 |
| Mine repairs | 1,753 50 |
| Mine supplies | 35,166 50 |
| Freight on mine supplies | 89 05 |
| Mill incidental expenses account..... | 279 14 |
| Mill labor and salaries (salaries, \$3,300; labor \$52,196 43).. | 55,496 43 |
| Mill supplies | 67,316 36 |
| Freight on mill supplies | 1,586 80 |
| Mill repairs | 13,027 20 |
| Ore purchase | 66,899 22 |
| Ore transportation | 8,732 28 |
| Bullion discount..... | 35,585 36 |
| Bullion tax | 2,647 28 |
| Bullion freight | 9,019 62 |
| Bullion reclamation..... | 2,357 36 |
| Pump repairs..... | 2,755 25 |
| Compressor and Burleigh drill account..... | 22,348 15 |
| Real and personal property tax | 6,518 91 |
| Purchase property and mining claim account | 410 00 |
| Surveying account | 100 00 |
| Telegraphing account..... | 295 40 |
| Insurance account..... | 400 00 |
| Interest and discount account | 2,464 23 |
| Rentals | 110 00 |
| Legal expense | 1,705 00 |
| Office expense account..... | 8,861 10 |
| Total | <hr/> \$426,482 95 |
| Cash on hand December 31, 1878..... | 8,414 21 |
| Total | <hr/> \$434,897 16 |

DAY MINE.

This mine is situated on the eastern slope of the Bristol Range of mountains, near its base, about eight miles from the town of Bristol and fourteen miles from Pioche. It was located in 1877, under the name of Jack Rabbit. After its purchase and incorporation by the company who now own it, it was called the Day. The rock formation it is found is limestone. A very rich pocket of ore was found near the surface, which has produced about eighty thousand dollars. The ore is refractory, and not easily worked by mill process, only about sixty-five per cent. of the silver being obtained by this mode. The mine has been opened by means of tunnels, and a winze in the ore body. The lower tunnel has been run

about four hundred feet, three hundred and fifty more being necessary before reaching the winze. Owing to some trouble in the management, work was suspended for some time, but lately it has been resumed under the superintendency of Mr. John B. McGee, who proposes to adopt the method of smelting the ores. Fifty-five thousand dollars have been collected from the stockholders by assessment.

BRISTOL DISTRICT.

At the time of my last report work had been suspended in this district, and nearly all of the miners had abandoned the camp. In October, 1877, the Hillside mine was discovered and located by Mr. John Blair, soon after the Hillside Company was organized and incorporated by Messrs. Blairs and McGee, and work commenced for the development of their property. The National mine, furnace, town site of Bristol, springs, stone quarry, and all property belonging to Mr. Steele, were purchased for the Hillside company. The furnace was thoroughly repaired and soon the flow of bullion commenced. The Hillside is situated near the summit of the Bristol range of mountains. The vein runs north-east and south-west and dips to the south-east. The country rock is limestone. Substantial steam hoisting works have been erected. The work on the mine is being carried on through an incline which follows the pitch of the vein. The incline is well timbered from top to bottom and has now reached a depth of about two hundred feet. The vein is from five to eight feet in width, the ore from which yields an average of one hundred dollars per ton. The first station is at the eighty-five-foot level; from this point a drift has been run eighty feet. Another drift has been run on the one hundred and thirty-foot level, a distance of sixty feet. The furnace is situated about five miles from the mine. A good wagon road has been built at a cost of only one thousand and eighty-five dollars. A good grade has been obtained clear up to the mine. With the addition of a small amount of quartz the ore is easily smelted. There is sufficient ore in sight in the mine to keep the furnace running a long time to come, and as yet the limit of the ore bodies are unknown. The Hillside Company own also the Tempest and Red Cloud mines. Considerable work has been done on both locations. Some trouble has been experienced here in getting a supply of charcoal, though there is plenty of wood in the vicinity to produce all that may be needed for a long time to come. The price paid by the company is twenty-five cents per bushel. Stationary kilns have been erected near the furnace, which will soon produce the necessary coal. The bullion produced by the Hillside Company is valued at from five hundred to six hundred dollars per ton. One run of the furnace for seventeen days gave a yield of fifty-two thousand dollars. The bullion is shipped to York by Mormon teams, and thence to Ogden by the Southern Utah Railroad, at a cost of twenty-seven dollars and fifty cents per ton.

TEM PAHUTE DISTRICT.

Although this district was organized in 1865, and a number of valuable locations were then made, yet, until quite recently, outside capital has not been enlisted in its development. All the work done there has been by the miners themselves, and that, too, under many discouragements on account of the distance of the district from all bases of supplies, its difficulty of access in a mountain almost impassable without the building of an expensive road, and the scarcity of water, which is packed on mules from Ticapoo Springs, a distance of seven miles. Notwithstanding these drawbacks, work has been continually carried on, and a great deal of rich ore has been extracted and sold.

Quite recently, Mr. G. Colhier Robbins, of Eureka, has organized and incorporated the Wyandotte Silver Mining Company for the development of some of the mines of Tem Pahute. This company is organized under the laws of the State of Nevada, with a capital stock of ten million dollars, and one hundred thousand shares of the par value of one hundred dollars per share, full paid and unassessable. The machinery for boring an artesian well one thousand feet deep, has been purchased and shipped to the district. It is also the intention of the company to erect a twenty-stamp mill.

Another company has also been organized in Chicago, by Col. J. H. Baker, under the name of the Tem Pahute Land Mining and Improvement Company, and forty thousand shares of the stock set aside as a working capital. The mines owned by the company are the Sleeper, fifteen hundred feet; Poorman, fifteen hundred; Enterprise, fifteen hundred; Cadwallader, fifteen hundred; Bond, fifteen hundred; Hope, fifteen hundred; Old Point Comfort, fifteen hundred; Mint, one thousand; El Rekab, fifteen hundred; Dun Barton, fifteen hundred; Cliff, fifteen hundred. Besides these, the company have secured the half interest in the Liberal, Prodigal and Tattler locations. Assays from all these claims show exceedingly rich ore.

Concerning other mines in this district, the following information is given by a correspondent of the *Eureka Sentinel*. The Wyandotte, one of the most promising mines belonging to the Wyandotte Silver Mining Company, is located about half way between the base of the mountain and the summit, on the west side of the mountain, and shows a well defined quartz ledge, ranging from two to ten feet wide, of good ore. On this mine very little work has been done; in fact, none, except on the extreme surface, but for one thousand feet along the ledge it presents an unbroken cropping of good mineral-bearing quartz.

The Kenzie mine is located on the south and adjoining the Wyandotte, and is owned by the same company. It crops out in several places as much as ten feet wide, of good ore, and traceable the whole length of the claim on the surface.

The Colonel Head, owned by the same company, crops very near the upper edge of the quartzite belt, and shows considerable mineral in different places on the ledge. The mine is located on the south of the Kenzie.

The Rattler, on the south of the Colonel Head, crops in and east of the quartzite, and shows very fine bodies of ore in different places on the ledge.

These four mines, formerly owned by Judge Thompson, J. H. Alderson and others of Eureka, and lately sold by G. C. Robbins to parties in Philadelphia, comprise the Wyandotte Silver Mining Company's property, and certainly few companies in eastern Nevada have a better showing of mineral on the surface than is found on these four mines.

South of the Rattler is the African, owned by David Service, James Smith and others. This mine presents much the same appearance as the Wyandotte, described above, showing a well defined ledge of good ore. Very little work has been done on this mine.

The Blue Bell, owned by the same parties, lies on the south of the African, and is evidently the same ledge—shows some very fine bodies of ore. These two mines combined, when properly developed, in my opinion, will prove to be as valuable as any mines in the district. The same parties own a number of other locations, among which are the Broker, Hayes, Santa Fe, Garibaldi and others, all of which show some very fine ore.

The Demarara, owned, I believe, by the assignees of the late Mr. Russell, and others, is a very fine prospect.

The Inca mine has had more work done on it than any other mine in the district, having an incline sunk three hundred feet or more; but the incline is so crooked as to require four windlasses to get the rock to the surface, therefore, it is almost impossible to continue work until a new shaft has been sunk. The mine looks well, however, showing very rich ore the whole length of the incline, not in very large quantities, to be sure, but still, large enough to make it a good paying mine if it is properly worked. The mine is under the management of Mr. Gossett, who, I understand, is now trying to raise a company with sufficient capital to work the mine in a proper manner, and as he is an energetic man and well and favorably known in certain mining circles, he will no doubt succeed in his object, and then we may expect to see the Inca one of the dividend-paying mines of eastern Nevada.

There has been considerable ore shipped from many of the mines here to Typo, Eureka, and other places, which worked way up in the hundreds.

LYON COUNTY.

There has been a material decrease in the population of this county since my last report. At the last general election five hundred and ninety-five votes were polled, a falling off of two hundred and forty-one votes from the number polled two years before. In eighteen hundred and seventy-six, the assessed value of the real and personal property was one million four hundred and forty-nine thousand seven hundred and seventeen dollars, while in eighteen hundred and seventy eight, the amount had decreased to one million four hundred and twenty-eight thousand dollars. The prosperity of Lyon depends chiefly upon that of the Comstock and the numerous industries arising therefrom. The surface of the country being rough and mountainous, there is but a limited amount of agricultural and grazing land in the county. During eighteen hundred and seventy-eight, there were only seven hundred and forty acres under cultivation. Formerly, from forty to fifty thousand cords of wood were cut in the mountains to the south of Dayton, but the area of timber land has decreased to such an extent that there is no longer much profit to be derived from this trade. The chief industry is that of milling. The Carson River affords excellent water power, and within the limits of this county are some of the best quartz and tailings mills in the State. Dayton, the county seat, is eight miles from Virginia, and thirteen miles from Carson. The town has many substantial public buildings and private residences. Sutro, three and one half miles from Dayton and six miles from Virginia, derives its importance from its situation at the mouth of the tunnel. There has been considerable mining activity displayed in the county during the past two years. In the neighborhood of Silver City, there has been some work done on the mines of Devil's Gate District, and some ore extracted. New locations have been made, while some of the old ones have been abandoned. The ore returns for the year eighteen hundred and seventy-six were two hundred and thirty-six tons, of the value of three thousand six hundred and eighty-three dollars, while the returns one year later had increased to eight hundred and fifteen tons, of the value of seven thousand four hundred and sixty-seven dollars. During the year eighteen hundred and seventy-six, seventy thousand two hundred and seventy-four tons of tailings were worked, from which the bullion yield was three hundred and eighty-five thousand six hundred and seventy-five dollars, while during the latter year the number of tons worked was eleven thousand and fifty tons less; yet bullion to the value of three thousand four hundred and fifty-seven dollars more was obtained. The working of tailings is a source of considerable revenue to this county.

THE SUTRO TUNNEL.

It was not long after the discovery of silver on the Comstock that Mr. Adolph Sutro, after having made a personal examination of the developments then in progress, and having formed an opinion that the vein was a true fissure one and likely to be productive to an indefinite depth, conceived the idea that the most satisfactory and economical method of developing the various mines was by means of a gigantic tunnel from Carson Valley to the lode. This idea, suggesting in itself the greatest mining enterprise ever undertaken in this country, and rivaling in extent some of the costliest engineering feats of the Old World, was regarded at first as chimerical and impracticable, and the encouragement and capital necessary to the proper carrying out of the same was nowhere to be obtained. With slender means but indomitable perseverance, the originator persisted in the expediency of his plans, and amid the most trying discouragements, his arguments were at length brought to the attention of the mining and scientific world. It was then that the great hegira from California and the outside districts of Nevada to the Comstock was taking place, and a large yield of the precious metals had already been obtained. The rich strikes in Ophir and adjacent locations had increased the faith in the permanency of the mines, and capital and labor becoming more abundant with each new development which had been made, became likewise more interested in the prosecution of new enterprises and work.

In February, 1865, the Legislature of Nevada granted the right of way to Mr. Sutro and his associates, and authorized the commencement of the mining and draining tunnel, the construction of which they had so long and earnestly desired. While this act gave to the project the official sanction of the State, yet the amount of toll or royalty to be paid was not yet provided for, but was wisely left to a voluntary agreement between the tunnel projectors and the various mining companies interested in the completion of the work. After lengthy negotiations and great expenditure of money, it was at length agreed by a majority of the companies representing nine tenths of the value of the lode, that a royalty of two dollars per ton should be paid on every ton of pay ore extracted, and a compensation was also provided for the waste rock and passengers which should be transported through the tunnel after its completion. Foreseeing trouble and litigation in the carrying out of the scheme, the words of the agreement were carefully selected, and subsequent events have largely shown the wisdom of the precaution. At that time the title or fee to the mines was in the United States Government, and an Act of Congress was deemed necessary which should embody the general features of the Act already passed by the Legislature of the State, and which would grant other necessary privileges in addition. Accordingly, in about eighteen months from the time of the State legislative action, a period during which the friends of the tunnel were especially active in the furtherance of their plans, the bill commonly known as the "Sutro Tunnel Act" was passed. By the provisions of this bill the general government entered into a direct compact with Mr. Sutro for the completion of the tunnel, and in addition to giving the right of way, empowered him to purchase a tract of land at the mouth, and to claim the ownership of the mines within two thousand feet on either side of the

tunnel. Other minor concessions were also made by the Act, and the project seemed now in a fair way to completion. But there were many difficulties to be overcome. Objections were to be met, capital to be secured, and private interests were to be guarded.

After the passage of the Act of Congress, subscriptions to the capital stock to the amount of nearly a million dollars were obtained, and the Nevada Legislature by a concurrent resolution memorialized Congress to aid by a loan the successful completion of the great work. After considerable delay arising from the repudiation of subscriptions, and from opposition to the enterprise by the mining companies and the Bank of California, work was begun on the nineteenth day of October, eighteen hundred and sixty-nine, and has continued with more or less energy ever since. Owing to the insufficiency of capital and the many difficulties attendant upon the commencement of a new enterprise, the work progressed somewhat slowly at first, and by the first of January, eighteen hundred and seventy, only four hundred and sixty feet had been made. In December of the same year, when twelve hundred additional feet had been made, Congress authorized a commission to examine into the cost and utility of the work, and during the following summer the examination and necessary reports were made. The work was deemed altogether feasible by the report; the cost was estimated at four and one half million dollars, and the time necessary for completion was somewhat dependent upon the capital and machinery employed. About this same time Mr. Sutro succeeded in making such financial arrangements as he had desired, and with an increase of capital a more energetic prosecution of the enterprise was undertaken. In November, eighteen hundred and seventy-one, four vertical shafts were located along the tunnel line, and in the following January work on all these shafts was begun.

The mouth of the tunnel at the town of Sutro enters the mountain about one hundred and fifty feet above the Carson river bed. The grade is three inches in one hundred feet, and the distance to the point where connection was made with the east drift on the sixteen hundred and forty foot level of the Savage mine is twenty thousand and eighteen feet. The first shaft is located four thousand nine hundred and fifteen feet from the mouth, and the top is five hundred and twenty-two feet from the tunnel level. In eighteen months after the beginning of work upon this shaft, the level was reached and drifts east and west were started, the former in due time being connected with the tunnel header. A great deal of difficulty was experienced from the influx of water, and accordingly very effective pumps were placed in position, and an average of three million gallons per month, or one hundred thousand gallons per day, were discharged. The second shaft is located four thousand one hundred and fifty feet further from the tunnel mouth than the first, and its elevation above the tunnel level is five hundred and nineteen feet greater. During the seven months following the commencement, the work of sinking was prosecuted with considerable vigor, but when a depth of six hundred feet had been attained the work was stopped to place the necessary pumps in position. These were similar to those which had been placed in the first shaft, and were the Allison and Bannan double acting steam pumps.

After a delay of four months, sinking was resumed; and with an interruption during a part of the year 1873, the tunnel level was reached in the spring of 1874. East and west drifts were then started; and when the former had reached a distance of one hundred and seventy-one feet, and the latter one hundred and seventy feet, a large body of water was unexpectedly encountered in the west, and in less than a month the drifts

and shaft were almost filled to the top. In nine months afterwards, this enormous body of water was tapped by means of a hole one hundred feet long, bored by a diamond drill from the face of the tunnel header. The water then filled the two drifts, being a chamber three hundred and forty-one feet long and eight feet by twelve in dimensions, in addition to filling the five feet by ten shaft over one thousand feet high. The tapping of this water was the most interesting incident of the year. Upon the completion of the hole, the pressure was so great that the water burst through with tremendous force. Nothing seemed able to withstand it. Rocks and fragments of timber were carried along with irresistible power, and the miners were obliged to have a care for their lives. The outlet becoming stopped by the debris from the drifts and shaft, it was again opened, and the force of the water was so great that the steel drill was hurled out into the tunnel. Gradually, however, the water became exhausted, and in a few days work was resumed on the header. The third shaft is located four thousand four hundred and ninety feet from the second, and its distance to the tunnel level is three hundred and twenty feet greater than the second. After a depth of four hundred and fifty-six feet had been attained, owing to an influx of water, which could only be regulated with enormous labor and expense, the shaft was abandoned. The fourth shaft, seventeen thousand six hundred and ninety-five feet from the tunnel entrance, was abandoned when six hundred and seventy-four feet had been attained. The cause of abandonment was the same as that in the shaft above described. In addition to these main shafts, a small air shaft was successfully completed in the summer of 1872. It is situated two thousand two hundred and fifty feet from the mouth, and has a depth of two hundred and eleven feet.

During the years 1871 and 1872, the progress made was seventeen hundred and thirty feet, and at the end of the latter year three thousand four hundred and eighty feet had been completed. The average number of feet made per month during the two years was seventy-two and one twelfth. During the year 1873, one thousand nine hundred and nineteen feet were made, making a total excavation at the end of the year of five thousand three hundred and ninety-nine feet. The average number of feet made per month was one hundred and five and one third. The total estimate includes the six hundred and fifty-five feet made in the east and west drifts of the first shaft. During the following year the average monthly progress was two hundred and twenty-three and one third feet, and at the close of the year eight thousand and seventy-nine feet had been made. This great increase was due to the introduction during the year of six Burleigh drills, which were run by means of compressed air. The compressor, which had been constructed by the Societe Cockerill of Belgium, was located at the first shaft. But after the second shaft had been passed, this compressor was exchanged for a new one located at the second shaft, and constructed by the Humboldt Company of Kalk, near Dentz and Cologne, on the Rhine. Both compressors worked smoothly, and gave excellent satisfaction.

During the year 1875, the number of feet made was greater than during any year preceding or any year which has followed. No less than three thousand seven hundred and twenty-eight feet were made, and the average number of feet per month was three hundred and ten and two thirds. The average temperature of the air at the header was eighty-two and one half degrees greater than that given before, and that of the water was four and one half degrees greater. During the following year, the monthly progress was forty-five feet less than in 1876, and the total dis-

the tunnel will be at a depth of thirty-six hundred feet or nine-thirteenths of a mile below the surface of the mountain.

The advantages claimed for the work are numerous, and are likely to become greater when the same is completed. It will serve as a channel for the transportation of passengers and supplies for the mines, and the cost of the latter will be materially lessened. Natural ventilation will in a measure supersede artificial ventilation, and better results from labor may be expected. The cost of milling and mining being cheapened, low grade ore can be more advantageously worked. It is variously estimated that from fifty to five hundred million dollars are locked up in the low grade ores of the Comstock, and if these can be worked to advantage, then great results can be obtained. But the greatest benefit afforded by the tunnel is probably the increased facilities which are afforded by it for the drainage of the mines. Water, which has heretofore been pumped at an enormous expense to the surface, will need only to be raised to the tunnel level. In the Savage mine, water which has hitherto been raised twenty-two hundred feet, will now only be raised six hundred feet. In the other mines, the same comparative differences of level will be maintained. Much of the money raised annually by assessments is expended in the purchase of pumping machinery, and in the working of the same, and so troublesome has the water been found, that the cost of discharging the same has been estimated at three million dollars per annum. These and other advantages are likely to follow from the completion of the work, and by it the aggregate value of the Comstock mines is materially increased.

NYE COUNTY.

Some new districts have been organized in the western portion of this county during the past two years, which give promise of permanency and success. In the older districts there has been little change. The total amount of ore extracted in this county during the year eighteen hundred and seventy-seven, was twenty-five thousand eight hundred and ninety-seven tons, with a gross value of eight hundred and forty-two thousand five hundred and eighty-four dollars, being an increase over the product of the preceding year of nine thousand and eighteen tons, or two hundred and six thousand three hundred dollars. During eighteen hundred and seventy-seven three fourths of the product of the county was from the Tybo Consolidated Mines. The average value of the ore per ton, during the year was forty-two dollars per ton. The total amount of ore produced in the county during the seven years, ending with eighteen hundred and seventy-seven, was eighty-eight thousand seven hundred and eighty-five tons, with a value of four million four hundred and twenty-seven thousand two hundred and seventy-two dollars, being an average per year of twelve thousand six hundred and eighty-four tons of the gross value of six hundred and thirty-two thousand four hundred and sixty-seven dollars.

The agricultural prospects of the county have not materially changed since my last report. Scattered here and there throughout the different valleys are lands of great fertility, and the products find a ready market in the neighboring mining camps. The area of the cultivated land is twenty-seven hundred acres, of this four hundred acres are inclosed. The area of grazing land is six hundred thousand acres. Stock raising is carried on extensively. During the year eighteen hundred and seventy-seven there were in the county two thousand one hundred and sixty-three horses, eleven thousand five hundred and sixty-seven cows, and eleven thousand five hundred and sixty-seven sheep and lambs, and seven thousand five hundred and fifty calves, and beef cattle. The area of timbered land is four hundred thousand acres. There are four steam saw-mills in the county, and two hundred thousand feet of lumber were sawed during the year eighteen hundred and seventy-seven.

The population has not varied during the past two years. At the presidential election in eighteen hundred and seventy-six, eight hundred and sixty-six votes were polled, and at the last general election eight hundred and sixty-three votes were polled. The assessed value of real estate is five hundred and twenty-eight thousand and fifty-two dollars, and that of the personal property, five hundred and fifty-five thousand five hundred and seventy-nine dollars, making a total value of taxable property of one million eighty-three thousand six hundred and thirty-one dollars. For eighteen hundred and seventy-eight the tax was thirty-four thousand six hundred and seventy-six dollars and thirty-one cents.

LODI DISTRICT.

This district is situated in the north-west corner of Nye County, and about one mile from the line of Churchill County. It was organized May 14, 1875, though locations had been made some time previous. About fifty claims have been located in this district. A large amount of work has been done on the Illinois mine. It has been opened up to a depth of four hundred and fifty feet. At a depth on the vein of one hundred feet, a tunnel has been run in several hundred feet; and from this tunnel level winzes have been struck at different points. The vein is from two to eight feet in width, and the ore is chiefly carbonate of lead, which carries a large per cent. of silver, some of which assays as high as five hundred dollars per ton. The Lodi company own a ten-ton furnace, which smelts the ore very successfully. Wadsworth is the nearest point on the C. P. R. R. The bullion is shipped to this point, and from here all supplies are received. Water and wood are scarce, the former being brought in pipes a distance of about five miles.

Quite recently an important development has been made about one and one half miles north of the Illinois mine, on the original Lodi ledge. The vein can be traced about two thousand feet on the surface, and runs north-east and south-west. An incline has been sunk one hundred and forty feet, and from this point a drift run sixty feet in good ore all the way.

The north wall of this vein was penetrated, and a winze or shaft sunk in iron ochre twenty feet, where a well-defined vein four feet in width, consisting of chlorides and carbonates of lead with silver was found. It is seven feet wide at a depth of thirty feet; and the ore assays from forty to one hundred dollars per ton in silver.

MAMMOTH DISTRICT.

During the past two years but little work has been done on any of the mines in the vicinity of Ellsworth. Many of the locations have been abandoned, the ore found being of too low grade to be profitably worked. The mill was repaired and kept running for some time on ore from the Alexander mine; but since the erection of a mill by that company at Grantsville the Ellsworth mill has been shut down. In May, 1877, some important discoveries were made at Carbonate Point, about ten miles west of Ellsworth, and six miles south of Lodi, by Mr. J. Downey. A number of locations were made, and work immediately commenced for their development. Most of the citizens of Ellsworth soon went thither, and in a short time the town of Downeyville sprung up. The mines are located on a spur of the Ellsworth range of mountains, just north of the old Wellington road, and near where the mountains disappear in the valley to the west. The geological formation in which these mines are found is limestone. The ore is smelting, consisting of carbonates and galena. Average assays from the Lizzie have given one hundred and forty-one dollars and forty-five cents per ton in silver, and ninety-six per cent. lead. From

the Western, one hundred and thirty-one dollars and ninety-three cents silver, and eighty-four per cent. lead. A large amount of ore has been shipped to Sacramento for reduction. About three tons of ore make one ton of bullion. A twenty-five-ton furnace has been in operation since last June, but as some trouble has been experienced in smelting the ores it has not been running constantly.

The mineral belt is from six hundred to one thousand feet in width, the ore averaging about seventy-five dollars per ton in silver. P. Downey and Company own five locations of one thousand five hundred feet each in length, and six hundred feet in width, which cover the most valuable portions of the ore-producing belt. The ore deposits are found in pipes which crop out in many places to the surface, though in general they are covered with a limestone capping. Water is scarce, the nearest stream being five miles distant, though in the valley one mile distant good wells are found at a depth of eighty feet. Freight to Wadsworth, the nearest point on the C. P. R., is two and a half cents per pound.

UNION DISTRICT.

This district was organized in 1863, and is situated in the first range of mountains west of the Toyabe Mountains, fifty miles south of Austin. It embraces within its boundaries both the mines of Ione and Grantsville. At this time a large number of locations were made and considerable work was done. Operations were carried on quite extensively by the Knickerbocker Company until the year 1869, when work was suspended and the company's property in the vicinity of Grantsville was abandoned. Several attempts have been made since then to develop a paying mine in the Ione section of the district, but as yet without success, though large sums of money have been expended and a great amount of work has been done for that purpose. Recently the Ural Company, an Eastern incorporation, erected a ten-stamp mill which for a time ran quite successfully on the ores of this district. But this prosperity was of short duration, and now this company has also suspended operations.

At Grantsville the principal work was done on the Great Eastern. A tunnel or level was run alongside the vein a distance of seven hundred feet and at a depth of one hundred and twenty-five feet. No cross-cutting was done, however, except at the point where the vein was first encountered. Some ore was extracted but it was of too low grade to be profitably worked. A second tunnel was run to strike the vein at a depth of three hundred feet; it had reached a distance of four hundred and seventy-five feet and within about seventy-five feet of the vein when the property was abandoned. In 1875 the Great Eastern was re-located, under the name of the Alexander, by Mr. P. Lefler. In 1877 this mine was purchased by Mr. M. San Pedro and others, a U. S. patent was obtained, and the Alexander Company incorporated with a capital stock of five million dollars and fifty thousand shares. Work was begun by this company in October of the same year, and has been carried on continuously ever since without an assessment. Sufficient ore has been extracted and milled to pay all the expenses of development from the start. A twenty-stamp mill has been erected which commenced crushing

ore during last month. It has been constructed with all the latest improvements in quartz milling machinery, stamps of eight hundred and fifty pounds each, twelve five-foot amalgamating pans and six eight-foot settlers. The engine is of one hundred and fifty horse power, with a cylinder twenty-two inches in diameter by twenty-two inches stroke. It has two White's roasting furnaces, the dimensions of which are twenty-four feet in length and fifty-two inches in diameter.

About one hundred and fifty thousand dollars in bullion has already been produced, and with this mill in operation regular shipments may be expected for a long time to come.

The developments in the Alexander show an immense vein, varying in width from sixty to one hundred feet. The deepest working is two hundred and twenty feet. The ore is a chloride of silver and easily worked. It contains but little gold. The whole vein will average about thirty-five dollars per ton. Assorted ore for milling yields about eighty dollars per ton. However, much of the ore is richer and needs no assorting. An average assay from the deepest workings shows two hundred and twenty-five dollars per ton in silver. The course of the vein is north-east by south-west, and it dips to the south-east at an average of from forty-five to sixty degrees. The geological formation to the westward is limestone, and to the eastward it is porphyry. On the foot-wall there is a heavy clay lining. The facilities for mining and milling are good, both wood and water are obtained in abundance for all purposes in the immediate vicinity at little expense. The Alexander Mine is situated one hundred and ten miles from Wadsworth, on the Central Pacific Railroad, and is connected with that place by a good natural road. From this point all supplies are received.

PHILADELPHIA DISTRICT.

The shipments of bullion from this district during the past two years have been very light; the reduction mills have been idle the greater portion of the time. The work of exploration has, however, been in constant progress upon the Belmont and El Dorado South Companies' claims. This expensive work has necessitated the levying of numerous assessments, and as there has been no immediate prospect of the development of a paying body of ore, the consequence has been that, until quite recently, much distrust has been felt in regard to the future prosperity of the district. Many of the inhabitants have left for more prosperous camps, and business of all kinds has been steadily declining. At present the prospects of this district are more encouraging than they have been for a long time, and doubtless very soon as large shipments of bullion as ever will be made.

The property formerly owned by the Combination Company has been purchased by Messrs. Allen A. Curtis and Stephen Roberts, and incorporated under the name of the Highbridge Company. The mines owned by this company were located in 1865, and for some time thereafter were worked quite extensively, producing five hundred thousand dollars in bullion. One of the largest mills in the State was erected at great expense, and costly improvements in the way of shops, hoisting-works,

dwellings, etc., were made. The ore bodies which were found near the surface soon gave out, and instead of searching for others, the Combination Company virtually abandoned their property, for since then work was never resumed by the company. The property has lain idle for years, with the exception of a short time, when some unmethodical gouging for the remnants of ore left in the upper levels was done by some miners who had a lease of the property. It is possible though, that the work in this desultory manner convinced the miners of the value of the property, and occasioned its purchase by the present company. Soon after the organization of the Highbridge Company, systematic explorations were commenced for the discovery of the vein which had been lost in the old workings.

Only thirteen feet of drift had been run west of the old levels, when the lode was found, standing in its regular position. This vein has now been opened up horizontally a distance of five hundred feet, and found varying from two to eight feet in width. Much of the ore will work, at the mill, two hundred dollars per ton. Twenty-five stamps of the old mill have been overhauled and put in running condition. The reverberatory furnaces, heretofore in use, have been condemned, and a White's furnace has taken their place. Everything, at both the mill and the mine, is now in good condition, and promises well for the future.

SPANISH BELT DISTRICT.

There has been but little advance in the development of the mines in this district since my last report. Steam hoisting works have been erected upon the Barcelona, and the shaft has reached a depth of one hundred and seventy-five feet. The vein at this depth is fourteen feet in width, the ore averaging about seventy-five dollars per ton. Considerable water has been encountered, and, for the purpose of drainage, a tunnel was started to strike the vein at a depth of six hundred feet. This district was organized soon after the location of the mines at Belmont. It is situated in the same range of mountains, and is about seven miles distant. The Barcelona is the chief mine in the district. It is on a contact vein between porphyry and slate. The croppings can be traced for a long distance on the surface. The Barcelona Consolidated is an incorporated company, and most of the work done upon the mine has been paid for by assessments. Some ore has been shipped to San Francisco and sold there, and some has been worked in the mills at Belmont, but as yet the bullion is small. Other locations upon which some work has been done are the Eclipse, Transit, Mariposa, Emmett, Washington, Oriental, Rotanzi, Liguiza, and Catalonia. Quicksilver has also been found here, and several locations for that mineral have been made, but no paying body of ore has yet been found.

REVEILLE DISTRICT.

There has been but little change in the prospects of this district during the past two years. The ten-stamp mill belonging to the Gila Company has only been kept running at intervals. Systematic explorations have been made, and the work prosecuted with energy for the development of new bodies of ore. Several hundred tons of ore of high grade have been extracted, and lately the mill has been started, and shipments of bullion have been made. No dividends have been declared since eighteen hundred and seventy-five, at which time seventy thousand dollars were paid to the stockholders. Since then twenty-five thousand dollars in assessments have been collected. The prospects of the Company for success in the future are better now than for some time past.

JEFFERSON DISTRICT.

Some work has been done on the mines of this district at intervals during the past two years, though for the greater portion of the time the mines have been idle. Very recently work has been resumed on the Jefferson mine, a good force of miners employed, and the mill started up. A large and rich body of ore has been opened on the three hundred-foot level, by cutting through what has heretofore been considered the foot wall of the vein. Openings have been made from the old incline shaft (seven hundred feet in depth) at the different levels, and this recent discovery of ore has been found to extend all the way down. This new vein or body of ore is from three to four feet in width, and pitches to the south from the shaft. The ore is a black sulphuret of high grade, and carries about twenty-five per cent. gold. This is the most important discovery ever made in this mine, and already there is sufficient ore in sight to keep the Company's fifteen-stamp mill running for some time to come. The machinery at the hoisting works is in good condition. The mill has been put in running order, and has already begun to make regular shipments of bullion. The present outlook of this district is much more favorable than it has been for a long time.

TYBO DISTRICT

This has been the most prosperous mining district in Nye County during the past two years. There has been a steady increase in the production of bullion, and the outlook for the future was never better than at present. The bullion yield is now nearly one hundred thousand dollars per month, and since the mines here have been worked, has amounted to two million five hundred thousand dollars. New and expensive hoist-

ing works have been erected. The two furnaces, having a daily capacity of one hundred and fifty tons, are kept steadily running. A depth of one thousand feet has been reached on the 2 G. During the past summer, the company's mill was put in running order, and started on the quartz ores of the district. Material improvement has been made in the process for treating the rebellious ores. The chief portion of the ores found in this district are smelting ores, but some ore is found which can be more profitably worked by mill process. The principal mines are the 2 G., Bunker Hill, La Fayette, Hunki Dori, Crosby and Casket, all of which belong to the Tybo Consolidated Company. About two hundred and fifty men are employed by this company, and the monthly expenses are about fifty thousand dollars. Twenty-eight hundred bushels of charcoal are consumed daily by the furnaces. The chief supply of ore is obtained from the 2 G. and La Fayette. The ore is principally yellow and gray carbonates and galena, which yields from fifty to seventy-five dollars per ton in silver. All the improvements are of the most substantial character, and the mines are worked in a very systematic manner. A tram-way connects the 2 G. mine with the furnaces, so that the expense of hauling the ores is very small. The Tybo mines were discovered in 1870 by Dr. Gally and Mr. Gillette. The 2 G., their principal location, was soon after sold to the present Tybo Consolidated Company. The town of Tybo is one of the most flourishing camps in eastern Nevada. It is well and substantially built, and business of all kinds is in a thriving condition. A weekly newspaper, the *Tybo Sun*, is published here. The distance from Belmont is thirty-five miles, and from Eureka it is ninety miles. With the latter place it is connected by a daily stage line, and from this point all supplies are received.

ORMSBY COUNTY.

The greater portion of this county is mountainous; the Pine-nut Range occupies the eastern section, and the Sierra, with its foot-hills and spurs covers a large part of the western portion. Eagle Valley occupies the space between. The area of cultivated land is one thousand two hundred and thirty-two acres. There are eight thousand acres of agricultural land, of which five thousand five hundred acres are inclosed. Wheat, barley, oats, potatoes, hay, and different varieties of fruits grow here, the quality of which is rarely excelled. During the year 1878, thirteen hundred and forty-five bushels of wheat, three thousand and sixty bushels of oats, three thousand eight hundred and thirty bushels of barley, and twenty-four thousand four hundred and ninety bushels of potatoes, were raised.

The prosperity of the county is largely dependent upon that of the Comstock. There are no productive mines within its limits, although a number of districts have been organized and a great many claims have been located, upon which a considerable amount of work has been done. Seven quartz-mills are located in the county, and these are supplied with ore from the mines on the Comstock. During the year ending with June, 1878, one hundred and twenty-two thousand nine hundred and thirty-eight tons of ore were crushed. The wood trade is an important element in the resources of this county. In the immediate vicinity of Carson most of the wood has long since been consumed, but large and substantial flumes connect the forests of the Sierras with the Carson River and Virginia and Truckee Railroad. The assessed value of real estate is one million four hundred and twenty thousand three hundred and sixty-nine dollars; and that of personal property nine hundred and eighty thousand three hundred and fifty-three dollars; making the total value of taxable property two million three hundred and twenty-eight thousand seven hundred and twenty-two dollars.

The popular vote at the last general election was one thousand and thirty-eight; a decrease of three hundred and eleven since the election of two years ago.

STOREY COUNTY.

The flourishing condition of this county during the past two years is mainly due to the continued production of rich ore by the "bonanza mines." Although for a time dividends have not been paid, still there is a large amount of bullion produced. The work of prospecting and development has been vigorously carried on during the past two years. New and substantial improvements have been made all along the lode. The recent discoveries in the north-end mines have caused increased activity and given renewed confidence in the permanency of the Comstock. The number of tons of ore crushed during the last year was four hundred and seventy-eight thousand four hundred and thirty-eight, the gross value of which was thirty-four million nine hundred and sixty-seven thousand three hundred dollars. The tons of tailings were eighty-three thousand five hundred and sixty-three, of the value of eight hundred and eleven thousand and forty dollars, making a total of thirty-five million seven hundred and seventy-eight thousand three hundred and forty-seven dollars. The California and Consolidated Virginia mines during the year ending with December, eighteen hundred and seventy-seven, produced three hundred and sixty-one thousand eight hundred and thirty-two tons of ore, having a value of thirty-two million twenty-eight thousand eight hundred and seventy dollars. The total bullion yield of these two mines to the present time has been over one hundred million dollars, and their total dividends seventy million seven hundred and forty thousand dollars. During the seven years ending with eighteen hundred and seventy-seven the entire yield of the Comstock was three million seven hundred and seven thousand four hundred and five tons, with a value of one hundred and sixty-eight million eight hundred and sixty-four thousand two hundred and thirteen dollars. The yield of the Comstock from the time of its discovery to the present time, has been about three hundred million dollars. The estimated population of Storey County is nineteen thousand. Five thousand seven hundred and seven votes were polled at the last general election.

CONSOLIDATED VIRGINIA.

This has proven the most productive silver mine in the world. The unprecedented bullion yield during the last five years has never been excelled, and history has been searched in vain for an account of a mineral deposit of equal richness and bulk. Up to the middle of eighteen hundred and seventy-eight, the total bullion yield was fifty-nine million six hundred and thirteen thousand nine hundred and sixty-one dollars, and of this amount the gold product was in round numbers, twenty-six

million dollars, and the silver product thirty-three million and six hundred and seventy-five thousand dollars. In eighteen hundred and seventy-four, eight dividends of three dollars per share on one hundred and eight thousand shares were disbursed, and in the year following two dividends of three dollars per share, and ten dividends of ten dollars per share were paid. The total amount paid to the stockholders during this time was fourteen million and forty thousand dollars. In the year eighteen hundred and seventy-six, after three dividends of ten dollars per share had been paid, the number of shares in the mine was increased to five hundred and forty thousand, and the remaining dividends of the year were at the rate of two dollars per share. The total dividends of the year amounted to twelve million nine hundred and sixty thousand dollars.

During the first four months of the following year dividends were suspended, but in May they were resumed, and the total amount paid during the year was eight million six hundred and forty thousand dollars. During the year just closed four dividends of two dollars per share, and two of one dollar per share were paid, and the total amount aggregated five million four hundred thousand dollars. The total amount paid to the stockholders of the mine has been forty-one million and forty thousand dollars, or seventy-six dollars per share on a basis of five hundred and forty thousand shares. The dividends paid by the California and Consolidated Virginia combined have aggregated seventy million seven hundred and forty thousand dollars, while their bullion yield has aggregated more than one hundred million dollars. During the year eighteen hundred and seventy-seven, all of the ore extracted from the Consolidated Virginia was taken from between and including the twelve hundred and seventeen hundred and fifty foot levels of the mine. The reports of the President, Superintendent and Secretary give a clear and succinct history of the mine during the past year, and the same are herewith subjoined:

PRESIDENT'S REPORT.

SAN FRANCISCO, January 9, 1879.

To the Stockholders of the Consolidated Virginia Mining Company: On the eighth of July, 1878, Mr. James G. Fair resigned his position as Superintendent, and Mr. W. H. Patton was elected to fill the vacancy. Monthly dividends of two dollars per share were paid in January, February, March and April, and in May and June each one dollar per share, making a total of ten dollars per share for the year.

I here reproduce the bullion statement of last year's report adding the product of 1878:

| | Gold. | Silver. | Total. |
|------------|---------------|---------------|---------------|
| 1873 | \$ 314,288 68 | \$ 331,293 49 | \$ 645,582 17 |
| 1874 | 2,063,438 13 | 2,918,045 92 | 4,981,484 05 |
| 1875 | 7,035,206 54 | 9,682,188 22 | 16,717,394 76 |
| 1876 | 7,378,145 36 | 9,279,504 11 | 16,657,649 47 |
| 1877 | 6,270,518 68 | 7,463,500 39 | 13,734,019 07 |
| 1878 | 3,770,007 98 | 4,226,745 13 | 7,996,753 11 |

Total. \$26,831,607 37 \$33,901,277 26 \$60,732,882 63

Dividends paid, \$41,040,000.

The legal expenses of the company were still further increased by reason of its defense against four suits brought by the State of Nevada for penalties in tax suits. Stockholders may form a clear idea of the expense attending the company's litigation, when it is stated that many of the witnesses for the company were brought from a great distance. At one time, and for a single suit, the company had twenty-eight witnesses collected in Virginia City, Nev.

Application for a United States patent for the company's mining claim was made in the early part of 1878. * * * *

MILLING AND SUPPLIES.

Some discussion has occurred in the public press, instigated principally by disaffected and designing stock operators, regarding the propriety and practicability of the Consolidated Virginia Mining Company owning a mill and reducing the ore extracted from the mine. The arguments sought to be advanced by those who favored milling and reduction by the Company have been tinctured with malice and sophistry, and in no single instance that we recall have the opponents of the present plan presented substantial reasons in support of their position. The statements of those who have repeatedly and persistently urged the Company to erect or purchase expensive mills have, for the most part, been based on a superficial knowledge of mining affairs—a fact easy of demonstration when the history of the Consolidated Virginia Mine is reviewed. At the time the ore deposit was first discovered, its extent was a matter of great uncertainty; and certainly there was not enough to warrant the erection of a very large mill. The Company did not begin to pay dividends until May, 1874, and after the 1160-foot level was reached, and at that stage of the development of the mine the erection of a mill would have probably involved two assessments of three dollars each on the one hundred and eight thousand shares constituting the capital stock. Not only did the Company avoid the expense of building a mill, but they escaped what would have proved a costly delay for the stockholders. Instead of making what would have then been unhesitatingly pronounced an unwise investment in mills, the Company had the ores from the mine milled and reduced by the mills which offered the necessary facilities and cheapest rates. Harsh experience has demonstrated, again and again, that it is not profitable for a mining company to own a mill and work their own ores. This is especially true of a company mining in a camp or city which already has sufficient milling facilities to meet existing requirements. The erection of a quartz mill to crush the ores of any one mine, except the value and extent of the mine has been ascertained to a certainty, is always hazardous. The risk is increased in proportion to the cost of said mill. The exhaustion of the ore body means the closing of the mill. And no property depreciates with such rapidity as an idle quartz mill. An idle quartz mill not only represents a large interest account and an expense for insurance, taxes and watchmen, but there is a constant deterioration in the value of the machinery by reason of rust and other damage. It is safe to say that the mill property, after the ore supply of the mine is exhausted, is not worth ten per cent. of the original cost. These and other economic facts in connection with the quartz mill business have from the inception of the mining enterprise received the earnest attention of the Company. The wisdom of the Company's policy in the method of milling the ore yield of

the mine is clearly shown by the situation to-day. The Consolidated Virginia Mining Company profited by the experience of other mining corporations on the Comstock when they refrained from entering the milling business. When the milling facilities of the Comstock were found inadequate, the Pacific Mill and Mining Company erected mills at their own expense to meet the temporary demand. Mark the result. The mills used to crush the ore taken from the mine stand idle to-day. Even the new Con. Virginia Mill, as it is called, and which was built at an expense of half a million dollars, is idle, and, therefore, not only profitless but a source of expense.

To emphasize the illustration we may add that the Gould & Curry Mining Company tried the experiment of running and operating their own mill and failed; that is to say, the Company found it more profitable to send their ores to custom mills. The milling experience of the Savage Mining Company may also be cited. The mills owned and operated by that Company, as shown by the records, ceased to be profitable even prior to the exhaustion of the ore body, and became a burden. The temporary gain which the Company realized, as compared with the employment of custom mills, was more than counterbalanced by the ultimate depreciation in the value of the Company's mill property, to say nothing of the loss of interest on capital invested in said property. Judging by the experience of the mining companies on the Comstock, and taking into consideration the history of the Consolidated Virginia Company, it is an open question if, in the event of an absolute development of a rich mine, the erection and maintenance of a mill by the Company would be either politic or profitable in the end. As far as the Pacific Mill and Mining Company is concerned, we may safely assert that had that corporation maintained the rates ruling when it came into existence, we should have paid from twenty-five to forty per cent. above the present rates for the milling of our ores. When the Pacific Mill and Mining Company was incorporated the schedule price for milling ores was thirteen dollars per ton. In October, 1876, that corporation reduced the price from thirteen dollars to twelve dollars per ton; in February, 1877, from twelve dollars to eleven dollars per ton; in April, 1877, from eleven dollars to ten dollars per ton; in January, 1878, from ten dollars to nine dollars per ton. The latter price prevails to-day. The corporation has not only handled the ore from the Consolidated Virginia mine in an economical manner, but in the matter of reduction a high degree of proficiency has been reached. The corporation mills now work the ores up to seventy-three per cent. of their assay value, whereas the mills run by the waters of the Carson river only gave a return of sixty-five per cent. As a matter of fact, the ore of the Consolidated Virginia mine has been worked upon the most economical plan to be found upon the Comstock. For the reasons above stated, a resolution to purchase the mills of the Pacific Mill and Mining Company, which was offered by a stockholder at the regular meeting of the Board of Trustees two years ago, was not entertained.

The Consolidated Virginia Company have been peculiarly fortunate in their wood and lumber contracts. In 1875 the price of timber was twenty-seven dollars per thousand feet, and wood sold at twelve dollars per cord. The competition induced by the Pacific Wood, Lumber and Flume Company, had the effect of steadily reducing prices. At the present time the prices are: for lumber, seventeen dollars per thousand feet, and for wood, ten dollars per cord. This wood and lumber corporation reduced prices and then, about two years ago, ceased furnishing the Consolidated Virginia Company with supplies, as they could not compete

with the parties now holding the contract. The policy of the Company has been at all times and under all circumstances to secure the supplies at the lowest market rates.

Your attention is respectfully called to the reports of the Superintendent and Secretary herewith submitted.

CHAS. H. FISH, President.

SUPERINTENDENT'S REPORT.

VIRGINIA, Nevada, December 31, 1878.

Charles H. Fish, Esq., President Consolidated Virginia Mining Company.—Dear Sir: The total quantity of ore which has been taken out of the Consolidated Virginia mine during the past year, ending December 31, is one hundred and twenty-two thousand eight hundred and thirty-one and a half tons. There were remaining on hand at the ore houses and at the mills, at the beginning of the year, one thousand four hundred and a half tons. There have been reduced one hundred and twenty-three thousand six hundred and twenty-four and three fourths tons, yielding bullion of the value of seven million nine hundred and ninety-six thousand seven hundred and fifty-three dollars and eleven cents, or sixty-four dollars and sixty-eight cents per ton; this yield being seventy-three and one tenth per cent. of the assay value of the ore, no allowance having been made for wet ore. We have now on hand at the ore houses and at the mills, six hundred and seven and one eighth tons, valued by assay at forty-six thousand nine hundred and sixty-three dollars and five cents. The value of the gold contained in the bullion produced was three million seven hundred and seventy-thousand and seven dollars and ninety-eight cents, and of the silver, four million two hundred and twenty-six thousand seven hundred and forty-five dollars and thirteen cents.

In addition to the ore extracted, there have been raised from the mine, in the past year, twenty-eight thousand three hundred and twenty-three tons of waste rock.

With this statement of general results, I will now proceed to review the operations of the year, detailing the work that has been done in the mine, and showing what progress has been made in the deeper explorations.

The 1200-foot level has been worked through the drift run the previous year from the Gould & Curry shaft, and has yielded a large quantity of ore of moderate grade. The ore body has followed to the south and east, connecting with the old stopes, and up for a distance of one hundred and fourteen feet, at which point the cap rock of the ore body was reached, and here the extraction of ore was discontinued. There are no reserves of productive ore on this level.

Work on the 1300-foot level was suspended at the time when the main shaft was closed for repairs. During this suspension of work, the main south drift and the south winze up to the 1200-foot level became badly crushed, and required enlarging and retimbering, which work has since been accomplished; and, in addition thereto, cross-cuts have been run easterly at the south end of the old stopes and at other points. By this work some low grade ore has been developed, but the known exist-

ence of large bodies of water to the east of the ore body has prevented us from doing the full amount of prospecting in this direction which is desirable. Arrangements are now being made to drain the water through the 1500-foot level to the C. & C. joint shaft, which accomplished, this level can be more thoroughly explored.

1400 and 1500-foot levels.—These levels yielded a large quantity of good ore until it became necessary to stop work, on account of the closing of the main (Consolidated Virginia) shaft for repairs. On the completion of repairs to the shaft, work was resumed in the various drifts which were found to be completely closed by the crushing of the timbers. On the 1400-foot level the ore has not yet been reached. On the 1500-foot level the south drift and cross-cut No. 2 have been reopened and connected with the main drift on this level, leading to the C. & C. joint shaft. This gives the required ventilation, and will enable us to extract the ore which remains on this level to good advantage, and also forms a portion of the system of connection designed to drain off the water which is known to exist to the east of the ore body on the levels above.

1550-foot level.—No new developments have been made on this level during the year. The main air gallery south to the Gould & Curry shaft has been kept open for necessary ventilation.

The work of hoisting from the 1650-foot level has not been interfered with by the closing of the main (Consolidated Virginia) shaft, as there is a direct communication between this level and the C. & C. joint shaft. A large quantity of high grade ore has been extracted. Extensive explorations have been carried on by means of drifts and drill holes to the south, west and east, but they have failed to develop anything new or of any value.

Explorations on the 1750-foot level, by means of all necessary drifts and winzes, have shown that the ore which was left under the sill floor of the 1650-foot level, extended down for a distance of forty feet, and south from the north line of the mine one hundred feet. From this point, although the ore body retained its width, the quality rapidly deteriorated. Most of the ore that would pay for working has been extracted, but some will yet be taken out by following small streaks that occur through the mass of low grade ore. The ore that was found in cross-cut No. 2 to the east of the main vein (as mentioned in the last yearly report) has not proved as extensive as was expected, as it pinched out at the height of thirty feet above the sill floor. Winze No. 2 has been sunk from a point ninety feet east of the east clay of the new ore body to a depth of one hundred feet, connecting with the main south drift on the 1850-foot level. Cross-cut No. 3 has been run to the east seventy feet, and cut the south end of the ore body exposed in cross-cut No. 2, and from this point an incline winze has been sunk to the level below, passing through ore of good quality and about three feet in thickness. The main south drift has been extended to a point which is distant three hundred feet south from our north line, and cross-cut No. 4 has been run east one hundred feet without making any development of value. The main lateral drift south to the Best & Belcher line has been maintained in good condition for ventilation purposes, and was invaluable in that respect during the time the main shaft was closed for repairs. A vertical winze has been sunk jointly with the Best & Belcher Company on our south line, at a point in the joint cross-cut two hundred and fifty feet east from the main south drift which leads to the Gould & Curry shaft. This winze is now down two hundred feet below this level, passing through porphyry and some

clay. At this depth a joint east cross-cut has been run for a distance of two hundred feet, passing through ground of a more favorable character than that on the level above.

The 1850-foot level has been opened by running a lateral drift south from California winze No. 3, and connecting with Consolidated Virginia winze No. 2, sunk from the 1750-foot level. This connection secures the necessary ventilation for this locality. From the bottom of winze No. 2, the main south drift has been extended two hundred feet, passing through porphyry and vein matter, and at this point work in that direction is suspended for the present. Cross-cut No. 2 from the bottom of winze No. 2, has been run west one hundred and twenty feet, cutting the west clay of the ore body, having passed through favorable looking vein matter and low-grade ore. Cross-cut No. 3 has been run from a point one hundred feet south of cross-cut No. 2, one hundred and forty feet west to the west clay, passing through the same kind of material as in cross-cut No. 2. Cross-cut No. 4 has been run from a point one hundred feet south of cross-cut No. 3, one hundred and thirty-five feet west to the west clay, passing through hard compact vein matter, which contains nothing of any value. At a point in cross-cut No. 2, fifty feet from the main south drift, a drift was run in a south-westerly direction to intersect cross-cut No. 3, in which drift ore of good quality was found, evidently being the same ore body which was developed to the east of the main vein on the 1750-foot level, but much wider, the sill floor being twenty feet wide by thirty feet long. Winze No. 3, sunk from the 1750-foot level has been connected with the stopes, and good ventilation secured. This winze has been continued down to the 1950-foot level, passing vertically through the ore for a distance of forty feet, when the west clay was struck, and from this point the winze followed the slope of the clay to the level below.

The 1950-foot level has been opened by a drift, run jointly with the California Mining Company, from the C. and C. joint shaft to California winze No. 3, for a distance of six hundred feet; also, by a lateral drift starting at a point three hundred and fifty feet west from the C. and C. joint shaft, and running south and south-westerly to a point which is three hundred and eighty feet from our north line. From this lateral drift, cross-cuts Nos. 2 and 3 have been run west to the west clay, passing through favorable looking vein matter and ore, which gives low assays. Much additional work remains to be done on this level before it can be said to be thoroughly prospected, and this work is now in progress.

2150-foot level.—We are now preparing to open this level from the C. and C. joint shaft, by a drift starting from the station, and running in a south-westerly direction. This drift is now in a distance of seventy-five feet, and will be continued to the ore body, and connected with a winze to be sunk from the 1950-foot level.

CONSOLIDATED VIRGINIA SHAFT.

On the first of May last the condition of this shaft made it necessary to close it, and discontinue all work through it for the purpose of re-timbering and general repairs. The requisite repairs were more extensive than had been anticipated, and this fact, together with extreme heat caused by the unavoidable interference with the natural ventilation, delayed the completion of the work until October. The shaft is now in excellent condition, and with the exception of about three hundred feet

and of sinking the C. and C. joint shaft, is charged to the ore. Third—The quantity of ore extracted being much less than was taken out in the previous year, it was so much the less able to bear the increased burden of expense imposed upon it.

I will conclude this review of the past years' operations by saying that, although the developments made in the mine, during the year, have not warranted the resumption of dividends, it must be understood that a large extent of ground remains unexplored on the 1850 and 1950-foot levels, and that explorations have only just been commenced on the 2150-foot level. The chances which still exist for development of ore in these three lower levels, taken in connection with the fact that our lowest (the 2150-foot) level is two hundred feet higher than the top of the late ore development in the Sierra Nevada Mine, give favorable hopes for the future.

Yours respectfully,

W. H. PATTERSON, Superintendent.

CHIEF CLERK'S REPORT.

A. W. Havens, Esq., Secretary Con. Virginia Mining Company.—Dear Sir: I herewith hand you Balance Sheet and statement of Receipts and Disbursements at the mine, for the year 1878. The sale of supplies is chiefly to the California Mining Company, as that mine is working mostly through our shaft, and for want of room is furnished most of her supplies from our lumber-yard and store-house. The Consolidated and California Shaft, although owned jointly, furnishes supplies as required and charges for the same, also for hoisting ore and waste, in proportion to work done for each mine. The value of the supplies is often enhanced by labor performed upon same. Yours respectfully,

J. M. TAYLOR, Chief Clerk.

Virginia City, Nev., January 5, 1879.

Cr.

Salaries and wages \$631,105 50

Purchase of Supplies:

| | | |
|---|-------------|------------|
| Wood..... | \$56,539 12 | |
| Timber..... | 193,693 14 | |
| Ice..... | 23,400 70 | |
| Iron..... | 5,606 03 | |
| Powder..... | 17,932 50 | |
| Candles..... | 12,496 78 | |
| Oil..... | 10,027 70 | |
| Fuse..... | 2,316 15 | |
| Labor..... | 335 78 | |
| Wire rope..... | 7,542 10 | |
| | | 330,790 00 |
| Transportation of supplies..... | | 11,703 04 |
| Miscellaneous supplies..... | | 85,839 82 |
| Supplies for joint B. and B. drift..... | | 14,451 79 |
| Water rent..... | | 2,500 00 |
| Office expense..... | | 1,777 65 |

Assay Office Expense:

| | | |
|--------------------|-------------|-----------|
| Wages..... | \$19,707 50 | |
| Supplies..... | 17,431 12 | |
| | | 37,138 62 |
| Surveying..... | | 100 00 |
| Team account..... | | 855 02 |
| Legal expense..... | | 9,534 55 |
| Real estate..... | | 9,000 00 |

Taxes:

| | | |
|--|------------|--------------|
| Real estate..... | \$1,935 50 | |
| Mine proceeds..... | 206,233 18 | |
| | | 208,168 68 |
| Pumping expense..... | | 11,497 01 |
| Hoisting..... | | 113,760 28 |
| Reducing..... | | 1,295,226 00 |
| C. and C. shaft one half expense..... | | 89,500 00 |
| Exchange..... | | 4,642 67 |
| Draft remitted Secretary..... | | 85,000 00 |
| Samples shipped..... | | 6,888 25 |
| Samples on hand December 31, 1878..... | \$72 69 | |
| Cash on hand December 31, 1878..... | 5,675 74 | |
| | | 5,748 43 |

Total..... \$2,955,227 31

Inventory.

The following is the Con. Virginia supplies, ending December 31, 1878:

| | | |
|--|--------------|--------------------|
| <i>On Hand.</i> | | |
| Wood..... | \$1,260 00 | |
| Lumber..... | 3,060 00 | |
| Sheet Iron..... | 250 00 | |
| Bar Iron..... | 600 00 | |
| Steel..... | 450 00 | |
| Candles..... | 980 00 | |
| Oil..... | 560 00 | |
| Fuse..... | 210 00 | |
| Caps..... | 45 00 | |
| Nails and Spikes..... | 250 00 | |
| Picks, Shovels, etc..... | 450 00 | |
| Handles..... | 100 00 | |
| Miscellaneous..... | 1,300 00 | |
| | | \$9,515 00 |
| Supplies sold..... | | 213,116 24 |
| Supplies consumed..... | | 242,641 92 |
| | | <hr/> \$465,273 16 |
| Jan. 1, 1878—Supplies on hand..... | \$ 19,988 51 | |
| Supplies purchased..... | 445,284 65 | |
| | | <hr/> \$465,273 16 |
| Jan. 1, 1878—Assay supplies on hand..... | \$ 1,069 89 | |
| Assay supplies purchased..... | 17,431 12 | |
| | | <hr/> \$18,501 01 |
| Assay supplies consumed..... | \$17,041 01 | |
| Jan. 1, 1879—Assay supplies on hand..... | 1,460 00 | |
| | | <hr/> \$18,501 01 |

Inventory of Property at Virginia.

| | | |
|---|-------------|--------------------|
| Real Estate..... | \$35,000 00 | |
| Hoisting Works..... | 25,000 00 | |
| Assay Office and Superintendent's Office..... | 60,000 00 | |
| Machinery..... | 200,000 00 | |
| | | <hr/> \$320,000 00 |
| Supplies (as above.)..... | | 9,515 00 |
| Assay supplies (as above.)..... | | 1,460 00 |
| | | <hr/> \$330,975 00 |

Cost of Mine.

The following is the actual cost of mine from December 31, 1877, to December 31, 1878:

Dr.

| | | |
|------------------------------|--------------|----------------|
| Supplies consumed..... | \$242,641 92 | |
| Assay supplies consumed..... | 17,041 01 | |
| Salaries and wages..... | 650,813 00 | |
| Office expense..... | 1,777 65 | |
| Real estate..... | 9,000 00 | |
| Taxes..... | 208,168 68 | |
| Surveying..... | 100 00 | |
| Legal expense..... | 9,534 55 | |
| Team account..... | 855 02 | |
| Hoisting..... | 113,760 28 | |
| Reduction..... | 1,295,226 00 | |
| Exchange and interest..... | 4,642 67 | |
| | <hr/> | \$2,553,560 78 |

Cr.

| | | |
|---------------------------|-------------|----------------------|
| By hoisting..... | \$41,987 36 | |
| Assaying..... | 46,389 81 | |
| Rebate on freight..... | 388 70 | |
| | <hr/> | 88,715 87 |
| Balance, actual cost..... | | <hr/> \$2,464,844 91 |

| | |
|---------------------------------------|-------------|
| Average cost per ton..... | \$19 93 4-5 |
| One half expense C. and C. shaft..... | 89,500 00 |
| Average daily wages..... | 4 23½ |

Bullion Statement.

* The following is the bullion statement of the mine for the fiscal year ending with the date of December 31st:

| | | |
|---|----------|-------------|
| Tons of ore on hand December, 1877..... | 1,400½ | |
| Tons of ore extracted..... | 122,831½ | |
| | <hr/> | 124,231½ |
| Tons of ore reduced..... | | 123,624½ |
| | | <hr/> |
| Tons of ore remaining on hand December, 1878... | | 607½ |
| Total cost per ton..... | | \$19 93 4-5 |

Bullion Yield for Year.

| | | |
|-------------|----------------|----------------|
| Gold..... | \$3,770,007 98 | |
| Silver..... | 4,226,745 13 | |
| | <hr/> | \$7,996,753 11 |

| | |
|-------------------------------------|---------------|
| Ounces of fine silver..... | 3,269,197 1-5 |
| Average value per ounce Dorè..... | \$2 30 |
| Average ore value per ton, net..... | 54 68 |
| Weight, tons..... | 118½ |

Total Production to Date—

| | |
|-------------|-----------------------|
| Gold..... | \$26,831,605 37 |
| Silver..... | 33,901,277 26 |
| | <hr/> \$60,732,882 63 |

| | |
|----------------------------|-----------------|
| Ounces of fine silver..... | 26,141,851 9-10 |
| Weight, tons..... | 1,101½ |
| Bars..... | 17,027 |

C. AND C. JOINT SHAFT ANNUAL STATEMENT.

The following is the annual statement of the C. and C. Joint Shaft, from December 31, 1877, to December 1, 1878:

Dr.

| | |
|---|--------------------|
| December 31, 1877, to cash on hand..... | \$3,379 03 |
| To Con. Virginia M. Co.'s supplies..... | 154,173 53 |
| Hoisting..... | 89,588 24 |
| Half expense..... | 89,500 00 |
| California M. Co.'s supplies..... | 147,320 60 |
| Hoisting..... | 58,754 80 |
| Half expense..... | 89,500 00 |
| General sale of supplies..... | 74,750 03 |
| Labor receipts..... | 3,665 15 |
| Total..... | <hr/> \$710,631 38 |

Cr.

| | |
|---------------------------------|--------------------|
| By pay rolls..... | \$128,179 75 |
| Purchases, wood..... | 135,745 51 |
| Timber..... | 155,297 68 |
| Miscellaneous supplies..... | 285,371 24 |
| December 21, 1878, balance..... | 6,037 20 |
| Total..... | <hr/> \$710,631 38 |

Inventory of Property at Virginia.

| | | |
|---------------------|-------------|--------------|
| Real estate..... | \$20,000 00 | |
| Hoisting works..... | 335,000 00 | |
| | <hr/> | \$355,000 00 |

Supplies :

| | | |
|--------------------|------------|--------------------|
| Wood..... | \$6,300 00 | |
| Lumber..... | 13,600 00 | |
| Coal..... | 300 00 | |
| Sheet iron..... | 2,400 00 | |
| Bar iron..... | 1,500 00 | |
| Steel..... | 900 00 | |
| Candles..... | 925 00 | |
| Oil..... | 325 00 | |
| Gas pipe..... | 140 00 | |
| Miscellaneous..... | 3,250 00 | |
| | <hr/> | \$29,640 00 |
| Total..... | | <hr/> \$384,640 00 |

*Actual Cost of Shaft.**Dr.*

| | | |
|--|--------------|--------------|
| Pay rolls..... | \$128,179 75 | |
| Purchase of supplies..... | 576,414 43 | |
| Supplies on hand, December 31, 1877..... | 29,526 54 | |
| | <hr/> | \$734,120 72 |

Cr.

| | | |
|--|----------------|--------------|
| By hoisting..... | \$148,343 04 | |
| Sale of supplies..... | 379,909 31 | |
| Supplies on hand, December 31, 1878..... | 29,640 00 | |
| | <hr/> | \$557,892 35 |
| Balance actual cost.... | 176,228 37 | |
| Entire cost of shaft to date..... | \$1,254,962 80 | |
| Average daily wages..... | \$4 34½ | |

SECRETARY'S REPORT.

OFFICE CON. VIRGINIA, MINING Co. }
 SAN FRANCISCO, January 9, 1879. }

CHAS. H. FISH, Esq., President:—Herewith I submit my report of receipts and disbursements of the Consolidated Virginia Mining Company for the fiscal year ending January 9, 1879.

Receipts.

| | | |
|--|-------------|----|
| Gross Product yield of mine for year..... | \$7,996,753 | 11 |
| Assaying..... | 46,389 | 81 |
| Balances outstanding last annual meeting, since settled... | 1,100,446 | 12 |
| Total..... | \$9,143,589 | 04 |

Disbursements.

| | | | |
|--|-------------|-----------|----|
| W. H. Patton, Superintendent's account cash balance in Virginia..... | \$ | 5,748 | 43 |
| Bullion | | 157,758 | 88 |
| Cash..... | | 1,152 | 70 |
| Nevada Bank—cash in bank..... | | 174,930 | 29 |
| Pumping..... | | 11,497 | 01 |
| Virginia office expenses..... | | 1,777 | 65 |
| Team account, Virginia..... | | 855 | 02 |
| Ore purchase..... | | 102,513 | 00 |
| Bullion samples..... | | 1,396 | 67 |
| Surveying..... | | 100 | 00 |
| Assay office expenses..... | | 37,138 | 62 |
| Best and Belcher joint winze..... | | 14,451 | 79 |
| Books and stationery..... | | 2,868 | 65 |
| Advertising..... | | 252 | 25 |
| Water..... | | 2,500 | 00 |
| Real estate..... | | 9,000 | 00 |
| Hoisting..... | | 71,772 | 92 |
| Taxes..... | | 208,997 | 48 |
| Reduction..... | | 1,295,226 | 00 |
| Interest and exchange..... | | 64,973 | 48 |
| Bullion freight..... | | 25,627 | 25 |
| Dividends..... | | 5,400,000 | 00 |
| Legal expenses..... | | 48,041 | 01 |
| C. and C. shaft..... | | 89,500 | 00 |
| Bullion discount..... | | 546,794 | 36 |
| Supplies..... | | 222,125 | 98 |
| Salaries and wages..... | | 641,543 | 00 |
| Expense..... | | 5,046 | 60 |
| Total..... | \$9,143,589 | 04 | |

E. and O. E.

Respectfully,

A. W. HAVENS, Secretary.

CALIFORNIA.

Next to the Consolidated Virginia, the California has proved the most productive mine on the Comstock Lode. During the two years 1876 and 1877, three hundred and thirty-nine thousand nine hundred and seventy-two tons of ore were produced, with a value of thirty-two million three hundred and twenty-five thousand six hundred and ninety-one dollars. Of this amount, fifteen million eight hundred and seventy-five thousand three hundred and eighty-five dollars represented the product of gold, while sixteen million four hundred and fifty thousand three hundred and fifty dollars represented that of the silver. The gold extracted during the year 1877 weighed eighty-three tons; the silver weighed four hundred and sixty-four and three fourths tons. Among the disbursements for the same period the reduction of ore is given at two million two hundred and twenty thousand and seven dollars; the salaries and wages at the mine, seven hundred and eighty-five thousand and twelve dollars; the hoisting, assaying, and expenses of the "C. and C." shaft, three hundred and seventy thousand six hundred and seventy dollars; the taxes paid in Virginia, four hundred and sixty-one thousand six hundred and thirty-seven dollars, and the discount on bullion, one million and thirty-nine thousand nine hundred and forty-seven dollars.

Eight dividends of two dollars per share were paid during 1876, and the total amount aggregated eight million six hundred and forty thousand dollars. Twelve dividends of two dollars per share, aggregating twelve million nine hundred and sixty thousand dollars, were paid during the year 1877, and during 1878 six dividends of two dollars per share and three of one dollar per share were paid, making the total amount of dividends for the year just closed eight million one hundred thousand dollars. The total amount paid to the stockholders in the twenty-nine dividends above named has been twenty-nine million seven hundred thousand dollars, or fifty-five dollars per share on the five hundred and forty thousand shares in the mine. The work for 1877 was confined principally to the levels between and including the fourteen hundred and eighteen hundred and forty; the work for 1878 will be found in detail in the reports herewith subjoined.

SUPERINTENDENT'S REPORT.

VIRGINIA, NEV., January 8, 1879.

Geo. Wallace, Esq., President California Mining Company — Dear Sir: The California mine has yielded during the year ending December 31, 1878, one hundred and thirty-four thousand eight hundred and eighty-seven tons, one thousand seven hundred and seventy-three pounds of ore. There remained on hand on the first of January, 1878, in the ore houses and at the mills five thousand and nine tons and one hundred and fifty pounds, making a total of one hundred and thirty-nine thousand eight hundred and ninety-six tons and one thousand nine hundred and twenty-three pounds. Of this ore one hundred and thirty-eight thousand seven hundred and eighty-five tons and one thousand three hundred pounds have been reduced, leaving on hand in the ore houses and at the

mills one thousand one hundred and eleven tons and six hundred and twenty-three pounds, valued by assay at sixty-four thousand three hundred eighty-five dollars and sixty-two cents. The ore reduced has yielded bullion of the value of ten million nine hundred and forty-nine thousand seventy-eight dollars and ninety-three cents, or seventy-eight dollars and eighty-nine cents per ton; this yield being seventy-two and a half per cent. of the assay value of the ore. The value of the gold in this bullion was five million five hundred and fifty-three thousand four hundred and four dollars and thirty-eight cents, and of the silver five million three hundred and ninety-five thousand six hundred and seventy-four dollars and fifty-five cents.

In addition to the ore which was extracted there has been raised from the mine, in the past year twenty-two thousand six hundred and ninety-three tons of waste rock.

With this statement of the general results of the operations of the past year, I will now submit for your information a detailed account of the work which has been done in the mine in the various levels, and from which the present condition and prospect of the mine can be understood.

1500-foot level.—The north-west drift from the main C. and C. drift on this level, which was being run to intersect cross-cut No. 4 has been completed, and has accomplished the purpose for which it was intended, and all the ore has been extracted that would be profitable to take out.

1550-foot level.—The north drift on this level, on the west side of the ore body, has been extended to and connected with winze No. 4 sunk from the level above, and the ground on the west side of the ore body has been thoroughly prospected, and nothing of any value been found. On the east side of the ore body the seam of ore which was lying to the east of the east clay, and which proved to be a spur from the main vein, has been worked out. There are no reserves of productive ore on this level.

The 1600-foot level has produced a large quantity of ore during the year, all of which has been hoisted through the Ophir shaft. It has been thoroughly prospected by means of drifts and cross-cuts to the south, east and west. The ore extended to the west clay for the distance of two hundred feet, commencing at a point two hundred feet south from the Ophir line. South of that point low grade ore came in, which continued to the south line. On the east side the pay ore did not extend to the east clay, and for four hundred feet south from the Ophir line the east clay was not exposed. At that point pay ore was found on the east clay and continued to the south line. In working north towards the Ophir line from a point one hundred feet south of that line the quality of the ore deteriorated and the productive ore gave out twenty feet from that line. The main drift to the Ophir shaft and the lateral drift east of the stopes have been kept open for the purpose of ventilation, and are now in a state of good repair.

The 1650-foot level has also produced a large quantity of good ore in the past year. It has been thoroughly opened and prospected by the necessary drifts and winzes and drill holes. The ore body did not show the same extent to the north as was developed on the 1600-foot level. A piece of barren ground consisting of vein porphyry and poor ore, coming in at a point one hundred feet north of winze No. 3, extends north for a distance of two hundred and fifty feet, at which point low grade ore was found which continued to the Ophir line. The north lateral drift has been extended to and connected with the joint Ophir winze on our north-

ern line, but as it passes through ground which is very heavy and crushes badly, it was found best to run a new drift to the west of the ore body—directly from the Consolidated Virginia shaft to the joint Ophir winze. This drift is completed and an upraise made to the level above—which will enable us to prospect this end of the level to advantage.

1700-foot level.—A very limited amount of work has been done on this level during the past year. A winze has been sunk to the level below from the east end of the cross-cut which was run from the bottom of winze No. 6. No developments of any value has as yet been made. The mass of ore is low grade, carrying small streaks of good ore through it, but not of sufficient value to make it profitable to extract at the present time.

1750-foot level.—The work of opening this level has been carried on by continuing the main north lateral drift to within eighty feet of the Ophir line; also by running west cross-cut No. 6 to the west clay, and by running east cross-cut No. 6 to a point vertically over the 1840 foot level, and sinking therefrom winze No. 6 to that level for the purpose of ventilation. West cross-cut No. 6 cut good ore at a point fifteen feet from the main lateral drift, which explorations upwards have shown to be a continuation of the ore which was exposed on the north end of the 1600 and 1700-foot levels, but of a better quality. The sill floor opened in this ore body is about forty feet long by twenty feet wide, and in working upward, the quality of the ore deteriorated as the stopes approached the levels above. Work has been suspended at that point for the present. A winze is being sunk from the sill floor down to the level below; and it shows low grade ore to the depth of twenty feet. It is now in vein matter and clay. At the south end of this level the ore left under the sill floor of the 1650-foot level has been found to extend down about forty feet, and is now being extracted. Nothing new of value has been developed on the south end of this level below this point, the ore body being about one hundred and ten feet wide, with well defined walls, diminishing rapidly in width as it extends north. The ore is of a very low grade, with occasional streaks of good quality, not sufficient, however, to give the mass a mining and milling value.

1840-foot level.—On this level (which corresponds to the 1700-foot of the Ophir mine) the joint Ophir east cross-cut has been extended to a point which is four hundred and twenty feet east of the main lateral drift, and from this point a large vertical winze has been sunk two hundred feet to the Ophir 1900-foot level for ventilation. A small vein or stringer of ore, giving good assays, was passed through in this winze. East cross-cut No. 5 has been run to a point three hundred and thirty-three feet from the main lateral drift.

The 1950-foot level has been opened by the completion of winze No. 3 sunk from the 1750-foot level, and by running therefrom a main drift east to the C. & C. joint shaft, a distance of six hundred feet. At a point three hundred and fifty feet west of the C. & C. joint shaft a drift was started from the main east drift spoken of, and has been run north three hundred and nine feet, and will be continued north to the Ophir line to connect with the joint winze sunk from the 1840-foot level, and this will be the main lateral drift of this level. An ore seam five feet wide, giving good assays, was cut in this drift and passed across and out of the drift in a north-easterly direction. The value and extent of this development will be determined by cross-cut which will be run, and by winzes which will be sunk during the present year.

The 2150-foot level is being opened by running a main drift south on the Ophir 2000-foot level (which corresponds to the California 2150-foot level), from a joint Ophir winze which has been sunk from the 1900-foot level of that mine on our north line. This drift is now in three hundred feet, and will be continued to connect with the 2150-foot station of the C. and C. joint shaft, a distance of two hundred and fifty feet, and be the main lateral drift of this level. As soon as this connection is made, cross-cuts will be run east and west from this drift, which will thoroughly prospect the level and determine its value.

CONSOLIDATED VIRGINIA SHAFT.

This shaft, which has been used in part for the working of the California mine, was in such a condition on the first of May last, that it became necessary to close it and discontinue all work through it for the purpose of retimbering it and for general repairs. The requisite repairs were found to be more extensive than was anticipated. From this cause, and on account of the extreme heat which followed the unavoidable interference with the natural ventilation, this work was not completed until October. The shaft is now in excellent condition, and with the exception of about three hundred feet below the 1300-foot level, will require no repairs for some years. The three hundred feet mentioned being opposite the old ore stopes, will probably crush and crowd toward the stopes and require some attention continually. During the progress of repairs in the shaft the hoisting works and other machinery on the surface were thoroughly overhauled and put in excellent condition.

CONSOLIDATED VIRGINIA AND CALIFORNIA SHAFT.

This shaft, which is usually known as the C. and C. joint shaft, has been sunk from a point twelve feet below the 1850-foot station to a point which is forty-four feet below the 2150-foot station. The 1950-foot station has been excavated, from which the main drift spoken of above was run on that level six hundred feet to the vein. At the 2050-foot level a station set of timbers has been put in place, but the excavation for the station has not yet been made. At the 2150-foot level the station has been excavated and put in proper shape for the development of that level. As fast as the shaft has been sunk all the necessary pumps, pump bobs, and other machinery for handling the water and other material have been put in place. The necessary excavations for water tanks have been made and the tanks placed therein; so that at this date the shaft is completely equipped to its lowest depth. There has been no diminution in the flow of water. A pump speed of eight and one half strokes per minute is required to handle it. The material passed through in sinking has been extremely hard porphyry, but the formation will evidently become softer as the shaft, in sinking, approaches nearer to the vein. As soon as practicable this shaft will be continued down to the 2350-foot level, and explorations be made from that point.

In connection with this report you will find complete statements carefully prepared by Mr. J. M. Taylor, our chief clerk, which will show

the receipts and disbursements of this office for the past fiscal year; also, inventories of property on hand at this date belonging to this company, and to the joint C. and C. shaft, and other interesting information pertaining to the operations of this company for the year.

You will observe that the cost of extracting ore in the year 1878 was greater than it was in the year 1877. The reasons of this increased expense are as follows: First—The closing of the Consolidated Virginia shaft for repairs (it being the main upcast or relieving shaft of this mine) so interfered with the ventilation during our intensely hot summer weather, that practically it took double the number of men to extract the same quantity of ore and to carry on the necessary dead work of the mine. The proposition of closing the ore stopes, and discontinuing the extraction of ore during that time was at one time entertained, but was abandoned, experience having shown that the cost of reopening the stopes (even if that could be done) would be greater than the extra expense of extraction. Second—As the mine increases in depth, in the same proportion the amount of dead work required to maintain the working drifts and shaft in working order increases. In estimating the cost of extracting the ore, all this expense, as well as that of sinking the C. and C. shaft, and that of opening the new lower levels is included. Third—The quantity of ore extracted was much less than in the previous year, and was so much the less able to bear the increased burden of expense imposed upon it.

CONCLUSION.

The lateral drifts, cross-cuts and winzes, which have been run in and through the different levels of the mine, and which have been particularly described above, secure a general good ventilation, and form a complete base from which we can now continue the extraction of ore from the productive levels, and carry on the work of developing the new lower levels. Leaving the two upper levels (the 1500 and 1550-foot levels) out of consideration, there still remain in sight in the other productive levels blocks of good ore; and it is not unreasonable to suppose that the low-grade ore which exists there may improve on further exploration; and portions of these levels remain entirely unexplored, and are yet to be prospected. It must be recollected that the three lower levels, particularly the 1950 and 2150-foot levels, have only begun to be opened, and that there is here a large extent of ground to be prospected. So far as we have advanced into these levels, the formation appears favorable; and already a seam of ore, yielding fine assays, has been reached in the main drift on the 1950-foot level. This seam has been followed for more than one hundred feet, and it lies fully sixty feet east of the main ore vein. We are encouraged to hope for renewed prosperity to the mine, not only from the indications visible in itself, but also from the important fact that ore developments have been made in the Comstock vein considerably deeper than our present workings, notably in the case of the Sierra Nevada mine, where the top of the late ore development is two hundred feet deeper than our 2150-foot, or lowest level.

Yours respectfully,

W. H. PATTON,
Superintendent.

SECRETARY'S REPORT.

George Wallace, Esq., President California Mining Company.—
Dear Sir: Herewith I submit my annual report of receipts and disbursements for the fiscal year ending January 15, 1879. Yours respectfully,

C. P. GORDON, Secretary.

Receipts.

| | | | |
|--|----|--------------|----|
| Cash in hand in Virginia, last annual statement..... | \$ | 1,208 | 31 |
| Cash in hand in San Francisco..... | | 701 | 45 |
| Cash in Nevada Bank, last annual statement..... | | 202,366 | 24 |
| Samples on hand in Virginia, last annual statement.... | | 2,837 | 59 |
| Samples on hand in San Francisco, last annual statement..... | | 373 | 34 |
| Gross product of mine since last annual statement..... | | 10,949,078 | 93 |
| Ore sales..... | | 70,000 | 00 |
| Nevada Bank, present overdraft..... | | 20,383 | 79 |
| Total..... | | \$11,246,539 | 65 |

Disbursements.

| | | |
|--|--------------|----|
| Dividends (No. 22 to 29, inclusive)..... | \$7,620,000 | 00 |
| Reduction of ore..... | 1,270,128 | 50 |
| Salaries and wages..... | 674,119 | 60 |
| Discount on bullion..... | 564,372 | 89 |
| Supplies in Virginia..... | 240,340 | 45 |
| Taxes..... | 255,431 | 12 |
| Hoisting..... | 126,659 | 58 |
| Refining..... | 103,222 | 38 |
| C. & C. Shaft..... | 89,500 | 00 |
| Interest and exchange..... | 62,164 | 19 |
| Assaying..... | 25,619 | 52 |
| Legal expenses..... | 23,834 | 77 |
| Bullion freight..... | 36,625 | 41 |
| Ore purchase..... | 8,653 | 48 |
| San Francisco office expense..... | 3,932 | 44 |
| Virginia office expense..... | 1,229 | 92 |
| Books and stationery..... | 1,647 | 35 |
| Advertising and printing..... | 559 | 75 |
| Team account (hauling in Virginia)..... | 571 | 50 |
| Bullion on hand..... | 633,546 | 70 |
| Cash on hand in Virginia..... | 3,445 | 15 |
| Cash on hand in San Francisco..... | 663 | 10 |
| Samples on hand in Virginia..... | 312 | 93 |
| Samples on hand in San Francisco..... | 58 | 92 |
| Total..... | \$11,246,539 | 65 |

UTAH.

This mine was located twenty years ago, and a shaft was sunk two hundred feet west of the present one, but no very important work was done until the reincorporation of the company eight years ago. Since then the work of development has been pushed vigorously forward, and some good indications obtained. The machinery and other equipments of the mine are mostly new, and of improved kind, and are capable of developing the mine several hundred feet below the present workings. Several lateral drifts have been run, and the south one on the thirteen hundred and fifty-foot level connects with the Sierra Nevada, thereby largely aiding in the ventilation of both mines. A new tank-pipe at the thirteen hundred and fifty-foot station has been lately completed, and other work has made excellent progress. On the surface several improvements have been made, the buildings have been enlarged and new machinery placed in position. The main incline during the past few months has been rapidly sunk, and at present is down one hundred and eighty feet on the incline below the thirteen hundred and fifty-foot level. There has been a slight flow of water, but not enough to retard its progress. During the ten weeks ending with the eighteenth of December, 1878, one hundred and ninety-nine feet of the incline were sunk and timbered, and the work continues at the average rate of twenty feet per week.

The number of shares in Utah is somewhat less than that in the other Comstock mines. The number of feet is one thousand, and the number of shares per foot is twenty. Twenty-three assessments have been levied on the capital stock, the present one of which will be delinquent on the sixteenth of January, 1879. The total assessments have aggregated seven hundred thousand dollars.

SIERRA NEVADA.

The Sierra Nevada location is one of the oldest on the Comstock. During the twenty years which have since transpired, this mine has had a very changeable experience. At times the work of exploration and development has been prosecuted with extraordinary energy; again it has been almost abandoned. The last dividend was declared in January, 1871, and while since then considerable bullion has been produced, yet the money necessary for carrying on the work has been mainly derived from assessments. The last assessment (three dollars per share) was levied in October, 1878. The total assessments have aggregated two millions five hundred and seventy-five thousand dollars. The bullion yield has been nine hundred and six thousand five hundred fifty-two dollars. The original location of thirty-six hundred feet was prospected by means of a shaft, and also a tunnel run into Cedar Hill. The management believing that a bonanza existed further to the north, began a new shaft about five years ago, and in the sinking of this the interests of the company have ever since been centered. The site is about one thousand feet north, and eleven hundred east of the old shaft, and the machinery now in use is of the most complete and substantial kind. During the past year explorations in the different drifts and cross-cuts have been pushed rapidly

forward. The recently remarkable rise in the stock of this mine was consequent upon the discovery of rich ore in the cross-cut, in the twenty-one hundred-foot level, from the main south incline of the new shaft. The value of the stock in May, 1877, was seventy-five cents per share, in May, 1878, it was two dollars and seventy-five cents, and in September last it sold for two hundred and seventy dollars per share. The expectations of the public, as well as of the management, have not as yet been realized in this development, and consequently there have been a very great depreciation in the value during the past three months. The work for 1878 is summarized in the reports of the Superintendent and Secretary herewith subjoined:

.SUPERINTENDENT'S REPORT.

During the past year, the following work has been done in the mine: We have sunk winzes and made upraises to the extent of nine hundred and eighty feet in drifts, and cross-cuts two thousand and thirty-six feet, main incline eight hundred and sixty feet, and east shaft two hundred and eighty feet, making a total of four thousand and one hundred and fifty-six feet. About the last of June, while sinking the main incline below the 2000-foot level, at a point about one hundred feet on the slope below the 2000-foot level, the incline passed from west country porphyry into a body of low-grade ore, which kept steadily improving in value to a point about ninety feet below the 2200-foot level, where the ore body has apparently taken a more vertical dip, which accounts for the incline passing to the east of the ore. The cross-cuts which have been run on the 2000-foot level both north and south of the main incline show very plainly that the incline has cut the cone of an extensive ore body at this point. The quartz shows to be only about seven feet wide, giving assays from two to five dollars. On the 2100-foot level the south cross-cuts show that the ore body has increased from six feet in width at the 2000-foot level to sixteen feet at this point, giving an average assay of forty-five dollars per ton. At a point about seventy feet below the 2100-foot level, a small drift was run back to the west a distance of fifteen feet, showing ore of an excellent quality. The end of this drift when stoped showed no indications of having reached the west wall. The face is still in high-grade ore. Work was discontinued at this point, and that of sinking the incline resumed. Not having sufficient air to run both, we thought it of more importance to keep this incline going down than to drive this cross-cut any further at that time. At the 2200-foot level the south cross-cut shows a width of vein of fifty feet, carrying about twenty-two feet of good milling ore. This cross-cut has not yet reached the west selvege of the vein, work has been discontinued as in other places mentioned, on account of insufficiency of air. No further developments will be made on this level until after connection is made with the east shaft, when proper ventilation will be secured, and further developments may be expected.

The present face incline is now in what is known as cap-rock or hanging wall of the vein. It is my opinion that the ore body from the point described above (ninety feet below the 2200-foot level), where the bulge in the ore occurred, seems to show a difference of angle of two or three degrees, just sufficient to be steadily reaching away from the bottom of the incline, the main footwall of the vein pitching at an angle of forty-five and one-half degrees, and the incline passing down at thirty-seven

and one-half, leaving a sufficient difference of angles to insure a widening of the ore body at a greater depth. During the year we found it necessary to enlarge our machine and carpenter shops, which will enable us to work with more convenience and to better advantage in the future, knowing that we shall have more work to do in these departments than we have had during the past year. We have also excavated, and have the masons now at work filling in and preparing the foundations for the large and powerful air compressor that is being made for us in San Francisco, which we expect to have in place by about the twenty-fifth of next month.

During the past year we have purchased a large number of engines, rock drills, and other machinery, which are now in use in the mine, and in good working order. We have now on hand nine hundred cars of wood, ten thousand feet of lumber, and all supplies of other kinds necessary for our present requirements.

SECRETARY'S REPORT.

Receipts.

| | |
|--------------------------------------|---------------------|
| Assessment No. 52..... | \$ 50,000 00 |
| Assessment No. 53..... | 50,000 00 |
| Assessment No. 54..... | 50,000 00 |
| Assessment No. 55..... | 100,000 00 |
| Assessment No. 56..... | 300,000 00 |
| Tax..... | 530 20 |
| Sale of ore..... | 315 50 |
| Pumping water, Union Con. M. Co..... | 3,440 00 |
| Total..... | <u>\$554,305 70</u> |

Disbursements.

| | |
|---------------------------------------|---------------------|
| Indebtedness last annual meeting..... | \$ 18,048 59 |
| City Tax..... | 530 20 |
| Foundry..... | 22,173 79 |
| Wood..... | 41,600 90 |
| Lumber..... | 22,289 83 |
| Freight..... | 16,890 69 |
| Exchange..... | 1,440 22 |
| Interest..... | 1,472 31 |
| Legal expenses..... | 22,928 64 |
| Safes..... | 1,734 20 |
| Supplies..... | 64,123 02 |
| Labor..... | 257,376 75 |
| Cash on hand January 15, 1879..... | 77,130 03 |
| Total..... | <u>\$554,305 70</u> |

UNION CONSOLIDATED.

As represented in the San Francisco stock boards, this mine, at the present time, is the most valuable one on the Comstock. The extraordinary rise in Union Consolidated and Sierra Nevada stock during the last few months stimulated activity all along the lode, but the consequent decline has been the cause of one of the most severe mining panics ever known on the Pacific Coast. The developments in progress at present are being anxiously watched, and the opening up of a new bonanza is expected. In September, an east drift to the North Consolidated Virginia shaft was started, and after a considerable distance had been obtained, an influx of water materially interfered with the operations. This water was, however, controlled by the Sierra Nevada and Ophir pumps. The reopening and retimbering of the main north drift on the sixteen hundred foot level has received a large share of the labor of the mine, and good progress has been made. It is intended that this drift shall connect with the North Consolidated Virginia shaft, and become the main air gallery and water drift for the prospecting of the ore veins on this level. The enlarging and retimbering of the main north drift from the Ophir incline, is going actively forward, and the work is meeting with success. Sinking the joint Mexican winze below the sixteen hundred foot level is making good headway, and the bottom is at present in porphyry, carrying occasional streaks of quartz of a very favorable character. The winze is now down about one hundred and thirty feet on the slope.

The sinking of the Jackson Shaft of the North Consolidated Virginia Mine will aid largely in the development of Union Consolidated. The site is advantageously located, and is in the direct course of the ore bodies of the Comstock to the north-east. Through this shaft will be done the hoisting for all the southern part of the Sierra Nevada, for the Union Consolidated, and for a large part of the Mexican ground. The work will be hurried to completion.

During November, the old dispute between the Union Consolidated and Sierra Nevada was settled, and more amiable relations between the two companies have since existed. A history of this dispute is substantially as follows: The former mine, originally six hundred feet, was located on the tenth day of June, 1859, by two Mormons, named Cook and Payne. The latter mine was located eleven days later, by one Miller and eleven associates, who took up thirty-six hundred feet. The excitement spreading, seven men from Grass Valley came with shotguns, and endeavored to run off the Union locators. A compromise was effected, the former party agreeing to take the south three hundred feet of the mine adjoining the Ophir, and to run a tunnel, the Mormons to pay one half the expense of prospecting. The Sierra Nevada locators then jumped the remainder of the Mormon claim, and after much difficulty finally held the ground. The Union Company purchased on the south two hundred and twenty-five feet of the Ophir ground, and C. B. Land gained an interest in the Union by a purchase representing twenty-five feet. In 1875 the Union Company obtained a patent, covering the whole of the original Mormon location of six hundred feet, which included the three hundred feet held and worked by the Sierra Nevada Company. A rehearing of the case was recommended, but as expensive litigation would have resulted, the late compromise was effected.

By virtue of the deed filed for record on the twenty-sixth day of November, the Union Consolidated Company deeds to the Sierra Nevada Company all that portion of the claim mentioned in the United States patent to Union Consolidated, commencing from the north line and running southerly two hundred and fifty feet. Sierra Nevada grants of its claim, to Union Consolidated, the thirty-five feet undivided. It also grants all ground claimed by Union Consolidated south of the north two hundred and fifty feet already mentioned, "and all the ground on premises granted or described in said patent, which are embraced or lie between the south line of said patent and a line drawn parallel to and three hundred and fifty feet distant from said south line, and two hundred and fifty feet distant from the north line of said patent." By this compromise, all suits and actions between the two companies were dismissed, and much expensive litigation escaped.

MEXICAN.

The recent developments in Sierra Nevada and Union Consolidated have given an increased interest to the workings in Mexican. The mine joins Ophir on the north, and was segregated from the same in the year 1874. Possessing no shaft nor machinery of its own, the work has been carried on through the Ophir shaft, and the expenditures have been somewhat lessened by engaging in joint work with the Ophir and Union Consolidated companies. The number of feet on the vein is six hundred, and the number of shares in the mine is one hundred thousand and eight hundred. The total assessments to date have aggregated two hundred and twenty-one thousand seven hundred and sixty dollars. At the annual meeting of the stockholders, held on the first Tuesday of December, the Superintendent's Report for the past year was given as follows:

THE SUPERINTENDENT'S REPORT

During the past year we have principally confined our explorations to the 1600-foot level, having retimbered and enlarged the main north drift from the Ophir incline to the Union Consolidated south line. This involved the running of a new drift, three hundred and thirty feet in length, which shortened the length of the main drift one hundred and twenty feet, improving our ventilation and enabling us to do our work to better advantage. We have also run on our north line an east cross-cut, jointly with the Union Consolidated Company, a distance of five hundred and twelve feet, east from the main north drift, at which point a chamber was excavated and an engine placed therein, for the purpose of sinking a winze, jointly with the above company, to the 2000-foot level. This is an incline winze, and has been sunk and timbered to a depth of ninety feet on the slope, and will be pushed forward to completion with all possible speed. We have opened out and extended the joint Ophir east cross-cut to a point two hundred and eighty-four feet from the main north drift; work was then suspended and has not since been resumed. No work has been done on the 1700-foot level, except the completion of the joint Ophir winze to the 1900-foot level, and its connection with the main north

drift of that level. The Ophir Company are extending their main north drift on the 2000-foot level, and will shortly reach their north line, when we will continue the same through the Mexican to the Union Consolidated south line, and by them be continued to the North Con. Virginia shaft. This will be a continuation of a large and permanent drift for ventilating and other purposes, and when completed will form a general system of working drifts, now being carried on, from the Gould & Curry on the south to the Sierra Nevada Company on the north end. Although no important development has occurred in our ground during the past year, the recent discovery of an ore body in the Sierra Nevada and Union Consolidated give us encouragement for important developments during the coming year. In connection herewith, I hereby submit my statement of receipts and disbursements for the past year:

SECRETARY'S REPORT.

Statement of receipts and expenditures of the Mexican Gold and Silver Mining company for the year ending December 3, 1878:

Receipts.

| | |
|--|--------------------|
| Cash on hand at the date of last report, December 4, 1877... | \$8,425 76 |
| Cash in hands of the Superintendent December 4, 1877..... | 390 95 |
| Assessment number five..... | 50,400 00 |
| Union Con. S. M. Co., labor on joint work..... | 12,665 00 |
| Ophir S. M. Co., labor on joint work..... | 1,711 00 |
| Bank of California—present overdraft..... | 7,460 23 |
| Total..... | \$81,052 94 |

Expenditures.

| | |
|--|--------------------|
| Wages and salaries at the mine..... | \$44,572 50 |
| Supplies and miscellaneous expenses..... | 18,232 81 |
| Legal expenses..... | 9,350 00 |
| Surveying..... | 100 00 |
| Office expenses at San Francisco..... | 7,749 50 |
| Assessment expenses..... | 287 50 |
| Interest and exchange..... | 627 38 |
| Cash on hand in office..... | 65 31 |
| Cash in hands of Superintendent..... | 67 94 |
| Total..... | \$81,052 94 |

San Francisco, December 3, 1878.

OPHIR.

The reports of the Superintendent and Secretary for the year ending December 15, give a complete history of the workings during 1878. They also indicate the present condition of the mine.

SUPERINTENDENT'S REPORT.

OPHIR SILVER MINING COMPANY,
VIRGINIA, Nev., Dec. 15, 1878. }

As per the last annual report, there remained on hand at the beginning of the present fiscal year five hundred and seventy-three tons of ore at the Winfield mill extracted under the Berry contract. The net yield of the same was twelve thousand four hundred and fifteen dollars and fifty-eight cents, which was shipped to the San Francisco office. During the month of March eighty-eight tons were extracted from the exposure of the Hardy vein on the 1900-foot level, netting the sum of eight thousand six hundred and fifty-three dollars and forty-eight cents; also in the month of June, three hundred and fifty-three and four hundred and fifty-seven two thousandths tons were obtained by sinking number one winze from the 1900 to the 2000-foot level, netting thirty-two thousand five hundred and thirteen dollars, which was shipped to the office at San Francisco. The following is a statement of the work done during the past year, the condition of the mine at present and my plan of operations for the coming year:

We have found it necessary on the 1300-foot level to retimber, enlarge and remove the debris in the main drift for the purpose of sustaining ventilation in the lower levels and allowing a free passage to the natural accumulation of water in the main incline. The 1465-foot level having been fully prospected by my predecessors, I have found it necessary to do any work at this point during the past year. There has been no work done on the 1600-foot level with the exception of enlarging and retimbering the main east and north drift to the Mexican line. The 1700-foot level has been connected with the 1900-foot level by a winze sunk jointly with the Mexican Company. The main south drift on the 1700-foot level to the California line has been enlarged, retimbered and placed in good repair. We have also run an east cross-cut jointly with the California Company on our south line from this drift four hundred and twenty-six feet east, at which point a joint vertical winze with the above Company has been sunk to the 1900-foot level. On the 1800-foot level a drift has been run in an easterly direction from the main incline a distance of three hundred and seventy-nine feet for prospecting purposes, without showing any favorable results. On the 1900-foot level the south drift, which had been advanced twenty feet into the ore body at the date of the last annual report, was turned east out of the ore and run in a southerly direction to the Ophir south line. From this drift cross-cuts numbers two, three and four were run west at distances respectively eighty-five, one hundred and fifty, and two hundred and twenty feet from cross-cut number one. The ore vein was reached in a distance of twenty-five feet in cross-cut number

two; in cross-cut number three, fifty-nine feet; cross-cut number four, one hundred and three feet. These cross-cuts showed an increase in the width of the vein, but a decrease in the value of the same. We also extended this drift north from cross-cut number one, one hundred feet, passing through vein matter giving low assays. The south drift on this level from the main incline has been extended to our southern boundary, connected with joint California winze down from the 1700-foot level and from thence in an easterly direction and connected with the east south drift. At this point a winze was sunk jointly with the California Company to the 2000-foot level, passing material of no value. Connection has been made by the main north drift on this level with the joint Mexican winze down from the 1700-foot level on our north line. In cross-cut number two a vertical winze was started down twelve feet east of the ore body. In this winze ore came in on the west side and continued down with the winze, the west wall assuming nearly a vertical position to the 2000-foot level. All the material in this winze after the ore was struck showed a milling value of one hundred and seven dollars per ton. On the 2000-foot level, immediately after the completion of the station at the main incline, an easterly drift was extended and connection with a west drift from the bottom of number one winze. The ore at the bottom of number one winze showed a width of nineteen feet. A connection has been made between the joint California winze on our south line from number one winze. A main north-east lateral drift has been run a distance of four hundred and eleven feet from the main east drift west of the ore body.

When the Ophir north line is reached it will be continued by the Mexican Company to their north line, and from thence by the Union Con. to the North Con. Virginia shaft. When we reach the Mexican south line with this drift, a joint winze with that company will be sunk down to the 2200-foot level. At a point one hundred feet north from the main east drift cross-cut No. 2 was run in a south-easterly direction, passing through porphyry and some ore giving good assays. No. 1 winze has been sunk to the 2100-foot level. At nineteen feet in depth the ore assumed an easterly dip and passed out of the winze on the east side, the remainder of the winze being sunk to the 2100-foot level through porphyry and ore. On the 2100-foot level a drift has been run from the main incline to the bottom of No. 1 winze, and continued in an easterly direction forty-eight feet from the winze, when indications of water were found. A diamond drill was run in and a stream of water tapped, since which time we have thought it prudent to discontinue work in this drift for the present. We have also started a drift from the 2100-foot station at the main incline in a north-easterly direction. This drift will be extended to the Ophir north line and there be intersected with the joint Mexican winze being sunk from the 2000-foot level. The main incline has just reached the 2200-foot station, with thirty feet additional for the sump. We shall commence immediately to open out this station and necessary chutes; when finished we will start cross-cuts both east and west on this level. In the meantime the main incline will be sunk to the 2300-foot level with all possible speed. We have commenced to stope out ore at the rate of seventy or eighty tons per day from the 1900 and 2000-foot levels, from that portion of the body intersected by No. 1 winze. Although some of the ore on the 1900-foot level is of low grade, it is probable that the yield will render assessments unnecessary during the coming year. Our machinery is not in very good condition, and has caused considerable trouble and expense for repairs during the past year, owing principally to the insufficiency of the foundations.

SECRETARY'S REPORT.

The report of the Secretary is as follows:

Receipts.

| | | |
|---------------------------------------|-------------|-------------|
| Cash on hand, December 19, 1877 | \$11,625 89 | |
| Cash with Superintendent | 8,446 62 | |
| | | \$20,072 51 |
| Sales of ore | \$41,166 48 | |
| Bullion, face value | 21,560 38 | |
| Assay samples | 83 08 | |
| | | \$62,809 94 |

Assessments.

| | | |
|--|-------------|--------------|
| No. 30—\$1 on 100,800 shares | \$100,800 | |
| No. 31—\$1 on 100,800 shares | 100,800 | |
| No. 32—\$1 on 100,800 shares | 100,800 | |
| No. 33—\$1 on 100,800 shares | 100,800 | |
| No. 34—\$1 on 98,100 shares | 98,100 | |
| | | \$501,300 00 |
| Cal. Mining Co.—Hoisting, labor, etc | \$57,704 97 | |
| Mex. Mining Co.—Power, etc | 16,940 67 | |
| Union Mining Company—Power, etc | 28,159 86 | |
| Other sales of material | 801 86 | |
| V. & T. R. R. Co., rebate on freight | 301 21 | |
| | | \$103,908 47 |
| Total | | \$688,090 92 |

Disbursements.

| | | |
|---|--------------|--------------|
| Salaries and wages at the mine | \$316,815 63 | |
| Supplies and miscellaneous expenses | 310,738 44 | |
| Water rent | 10,500 00 | |
| Surveying | 1,200 00 | |
| Taxes | 3,805 18 | |
| Reduction of ore | 5,765 00 | |
| Discount on bullion | 6,581 22 | |
| Assaying | 97 49 | |
| Office expenses at Virginia | 895 97 | |
| Office expenses at San Francisco | 9,319 47 | |
| Legal expenses | 3,777 70 | |
| Assessment expenses | 813 00 | |
| Insurance | 2,400 00 | |
| Interest and exchange | 3,877 77 | |
| Cash on hand | 14,294 51 | |
| Cash with Superintendent | 3,208 87 | |
| Total | | \$688,090 92 |

BEST AND BELCHER.

The work of this mine is carried on through the Gould and Curry shaft. Being located next to the Consolidated Virginia, a great deal of interest has attached to the workings during the past year. Latterly, cross-cutting has been vigorously prosecuted on the lower levels, and some good results obtained. The mine has been thoroughly prospected to the 1700-foot level; but as yet no great bonanza has been found. This latter level has been opened up by a drift running the entire length of the mine. On the twenty-first of September, 1878, in connection with the Gould and Curry, the company began the sinking of the Osbiston shaft. By this joint arrangement the expenditures of each company will be materially lessened. The shaft is a three compartment one, and since its commencement has been sunk at an average of about thirty feet per week. About the middle of December a depth of three hundred and fifty feet had been attained. Considerable difficulty was then experienced from the striking of a pocket of water, and the usual progress was retarded. The official letter of the superintendent of the same date furnishes information as to the present workings. It is as follows: The Consolidated Virginia joint east cross-cut was advanced forty feet during the week, and is now in one hundred and seventy-eight feet from the bottom of the joint winze, nineteen hundred foot level. The face is in hard porphyry. When this drift is in two hundred feet it is my intention to start a perpendicular winze, which will be sunk one hundred and seventy-five feet, and a level opened. Joint cross-cut, 1700-foot level, was timbered forty feet, and is now in one hundred and seventy-eight feet. We have passed through the worst cave, and we can do better hereafter. The Osbiston shaft made only nine feet during the past week, owing to a troublesome stream of water.

The above work has since been continued, and the shaft has been sunk considerably deeper. The money for the work is derived from assessments. The total assessments on Best and Belcher stock have aggregated to April, 1878, four hundred and thirty-eight thousand five hundred and ninety-two dollars. The number of feet on the vein is five hundred and forty-five.

GOULD AND CURRY.

Sinking the new joint-shaft has steadily progressed during the last few months, and on the fifteenth day of December a depth of three hundred and fifty feet had been attained. During the thirteen weeks preceding that date, the average number of feet made per week was twenty-seven. Lately considerable difficulty has been experienced from the influx of water, and the progress of the work has been materially retarded. During the last month work was resumed on No. 3 cross-cut on the 1700-foot level. This cross-cut is on the north line, and was then in a distance of five hundred and forty feet, or eight hundred and fifty feet east of the shaft. It is the intention to connect the old works with the new shaft by this cross-cut, and to do this it will have to be extended fifteen hundred feet farther east. The expense is divided between this Company and the Best and Belcher. For the week ending with Decem-

ber seventeenth, No. 2 cross-cut on 1900-foot level was run twenty-nine feet, making a total of two hundred and twelve feet; face in porphyry. No. 3 cross-cut was run thirty-four feet, making a total of fifty-eight feet; face in porphyry and quartz. No. 4 cross-cut was run twenty-seven feet, making a total of three hundred and thirty feet; face in birds-eye porphyry. The joint-cross-cut on the 1700-foot level was timbered thirty feet, making a total of one hundred and seventy feet. During the same week the Osbiston shaft made only nine feet, owing to a troublesome stream of water.

From the Superintendent's report for the year 1878, the following items are selected:

The main shaft has required constant attention and much work to keep it in repair, portions of the ground through which it passes being very heavy.

In sinking the main incline a stream of water of one hundred and fifty-five degrees Fahrenheit was encountered, making the work difficult. It now takes five strokes per minute of the 13-inch pump to handle this water. The Superintendent suggests that no attempt be made to sink the incline any deeper. First, the engine is of insufficient power; secondly, it would take a year to reach another level, and by that time he hopes to be connected on the 1700-foot level with the Osbiston shaft, and then much of the machinery and works at the Bonner shaft can be dispensed with.

On the 1900-foot level a lateral drift has been run the whole length of the claim, and three east cross-cuts are being run. No. 2, which is directly opposite the main incline, is in one hundred and eighty-three feet and has just passed through the west clay. On the level above and directly over this cross-cut most favorable ground was found, which leads to the hope of ore on this level.

Although a large amount of work has been done on the 1900-foot level, it is by no means prospected, and the Superintendent looks for favorable results in cross-cuts Nos. 2 and 3 that are now being run, as also in No. 1, that will be commenced this week. No. 1 will be a joint-cross-cut, and run east and west on the Best & Belcher south line.

From this level all prospecting will have to be done through winzes until the new shaft is down a sufficient depth to open the mine through it.

The Secretary's report shows the receipts to be three hundred and eighty-one thousand seven hundred and thirty-three dollars and fifty-three cents, and an indebtedness of fifteen thousand eight hundred and fifty-eight dollars and forty-six cents. The disbursements were three hundred and sixty-five thousand eight hundred and seventy-five dollars and seven cents. The Superintendent's report is favorable, and he anticipates no unusual expenditure for the coming year, except for hoisting works for the new shaft.

SAVAGE.

This mine is situated between the Gould & Curry and Hale & Norcross. It is one of the most thoroughly prospected mines on the lode. It has paid fifty-two dividends, the last one having been paid in June, 1869. The total amount paid in dividends has been four million four hundred and sixty thousand dollars, while the bullion yield has been about sixteen million dollars. Since the suspension of dividends, the money for carrying on the work has been largely derived from assess-

ments. More money has been collected in this manner from the stockholders of the Savage than from the stockholders of any other mine on the Comstock. The last assessment of one dollar per share was levied in September, 1878, and the total amount gained by assessments is three million nine hundred and seventy-two thousand dollars. This is at the rate of about thirty-five dollars per share on the one hundred and twelve thousand shares in the mine. The Gould & Curry bonanza extended from the surface to a depth of five hundred feet, and the Savage bonanza, though not so rich, was a continuation of the same.

The ore struck on the 567-foot level extended to the fifth or 967-foot level. Other ore bodies have been found on the seventh, eighth, and eleventh levels. The incline begun on the 1300-foot level carries the depth to two thousand two hundred and twenty feet, and a perpendicular winze carries it a considerable distance farther. The workings on the lower levels have been materially retarded by the influx of water, and the machinery of the mine has been mainly used in keeping it under control. A heavy stream was cut in the main incline, one hundred and fifty feet below the 2200-foot level. This rose to the 2000-foot level. The work was then directed to the cleaning out and retimbering of the north and south drifts, and while this work was being carried on in the north drift of the 2200 foot level, the second great body of water was encountered. It came so suddenly that the miners were obliged to flee for their lives, and, in spite of all the efforts to oppose it, it continued to rise until it reached a point seventeen hundred and fifty feet below the surface. It has since been kept partially under control, but complete drainage is not expected until the completion of the joint Savage-Norcross drift, which is now being pushed rapidly forward. The water will be sent through this drift to the Requa shaft, and thence pumped to the drift in connection with the Sutro Tunnel. The pumping apparatus is very effective of its kind, and the engine is a compound horizontal one, of five hundred horse power. The initial cylinder is twenty-seven inches in diameter, with a piston stroke of eight feet, while the expansive cylinder is forty inches in diameter, with the piston stroke the same as before. The engine is capable of running a column of fourteen-inch pumps to a great depth, and cost about one hundred and seventy-five thousand dollars. The hoisting machinery is powerful and well arranged, and the double cylinder is supplied with reels having a capacity for holding a steel wire cable four thousand feet in length. The combination shaft is described elsewhere in the report, and by it the value of the mine will be largely increased. The following official letter from the Superintendent, about the middle of December, will indicate the character of the workings at present: "The east cross-cut, 2100-foot level, has been advanced forty feet during the past week; total, one hundred and eighty feet. The face is in very soft ground, showing streaks of quartz, and will require retimbering. The south lateral drift, 2100-foot level, has been advanced thirty-three feet, making a total of seventy-six feet. The face is in vein porphyry, with streaks of quartz. The incline has been repaired nine feet. The 1400-foot level balance bob pit has been completed, and the bob pit will be put in immediately. The new fifteen-ton incline cable has been put in position, and works well. The Savage-Norcross joint drift is in six hundred and seventy-five feet, the face being in soft running ground. The water stands fifty-one feet below the 2000-foot level.

HALE AND NORCROSS.

The work for the year ending with February, 1878, as reported by the Superintendent, is as follows: With the exception of opening out and securely re-timbering the caved portion of one hundred and seventy feet of the incline, including the 1900-foot station; cleaning out and re-timbering the 1900 and 2000-foot levels to the north line; partitioning the entire shaft and incline from the surface to the 2000-foot level for the circulation of air, and excavating a pit near the 1500-foot level, and placing balance bob ready for connection, the attention of the entire force was applied to the freeing of the mine from hot water of a temperature of one hundred and fifty-four degrees Fahrenheit. On the first day of February, 1877, the water stood twenty-one feet below the 1900-foot level, and one year later fifty-one feet below the same level, a difference of only thirty feet for the year. The water had, however, been during the same period several times from forty to twenty feet above the 1900-foot level, and once near its original head of pressure a few feet within the 1700-foot level, and several times from fifteen to fifty-five feet below the 2000-foot level, and it stands to-day fifty-eight feet below the 2000-foot level.

A more favorable result is not reported owing to the many and frequent accidents which happened during the year to the Savage Company. These were especially in connection with the pumping apparatus, but on account of the more steady work during the past few weeks better results may soon be expected. The entire stoppage of the Hale and Norcross pumps during the year was sixteen days, twenty hours and forty-three minutes. The total number of strokes was three million one hundred and eighty-four thousand and four hundred and seventeen, or an average of six and thirty-five-hundredths strokes per minute, or six and five hundredths strokes per minute, including all stoppages. This was equal to pumping the surface during the year, one hundred and forty million seven hundred and fifty-one thousand and two hundred and thirty-one gallons of water. A point is being neared below the 2000-foot level where another plunger pump will be stationed, and when in operation, will greatly facilitate the progress of draining the lower levels. All machinery in and about the mine is in good condition, having received a thorough over hauling, and the addition of another air compressor will give great advantages for future operations. The total disbursements at this office during the past year amounted to two hundred and sixty-six thousand and three hundred and thirty-three dollars, of which twenty-four thousand and six hundred and nine dollars were paid toward the company's two-thirteenths interest in the Requa shaft, which has been sunk during the year eight hundred and forty-one feet. There is on hand at the mine wood, timber, coal, iron, steel, candles, oils, and hardware supplies equivalent to seventeen thousand and five hundred and eighty-four dollars and twenty-six cents.

Since the above report was made, the work has been mainly devoted to the pumping of water from the lower levels, and latterly to the running of an east drift on the 2000-foot level to connect with the combination shaft. The drift is being pushed rapidly forward, and when connection is made, the water will be pumped and conducted into a tank in the shaft, whence it will again be pumped to the surface or into a drift

in connection with the Sutro Tunnel. For the twelve weeks ending with the seventeenth of December, 1878, the average number of feet driven per week of this drift was fifty-four. The entire length of the drift then was six hundred and seventy-five feet, or two hundred and twenty-five feet distant from the shaft. During the same period of twelve weeks, the average number of strokes made per week by the Hale and Norcross pumps was fifty-four thousand and eight hundred and eighty-one, or five and sixty-seven hundredths strokes per minute. The water at present stands fifty-seven feet below the 2000-foot level. The machinery is in good condition, and the pumps are accomplishing the usual amount of work.

The number of shares in this mine is one hundred and twelve thousand, and the number of feet four hundred. The total assessments aggregate two million eight hundred and fifty-eight thousand dollars, and the total dividends one million five hundred and ninety-eight thousand dollars. The bullion yield is estimated at eight million ten thousand seven hundred and sixty-seven dollars.

CHOLLAR-POTOSI.

The Potosi croppings were among the earliest worked on the Comstock. They were located in 1859, and two years later a mill was erected. Since then the yield has been more regular than from any other mine on the lode. The total bullion product has amounted to nearly fifteen million dollars. The largest bonanza in this mine was found at a depth of five hundred feet. The ore deteriorated in value with an increase in depth, and of late but little has been obtained of any description. The total assessments have amounted to one million seven hundred and fifty thousand dollars, and the dividends paid have been three million and eighty thousand dollars. The number of feet on the lode is fourteen hundred, and the number of shares twenty-eight thousand. The following is from the *San Francisco Bulletin*:

The Chollar-Potosi Mine is the result of a consolidation. The Chollar was incorporated July 6, 1860, with a capital of one million eight hundred and eighty thousand dollars, in five thousand six hundred shares of the par value of three hundred dollars each, and the Potosi was incorporated January 3, 1861, with a capital of one million four hundred thousand dollars, in two thousand eight hundred shares of the par value of five hundred dollars each. We have no data of the operations of these mines for the first four years after the locations were made. In 1865, Chollar paid two dividends of forty dollars per foot each, and levied three assessments, two of which were fifty dollars per foot and the other thirty-four dollars per foot. During the same year, Potosi levied three assessments of fifty dollars per foot each and one of nineteen dollars, the last one being levied in October. In April, 1865, the mines were consolidated under the name of Chollar-Potosi, but the Potosi incorporation was not finally dissolved until November 3, 1865. In the following December the new organization levied two hundred and eighty thousand dollars upon stockholders to liquidate old indebtedness and for development purposes. What was done for the fractional part of the first year after the consolidation we have no means of knowing. Since June 1,

1865, the quantity of ore milled and the gross bullion product for the same has been as follows:

| | Tons. | Bullion. |
|--------------------------|---------|--------------|
| 1865-66..... | 35,300 | \$ 896,500 |
| 1866-67..... | 57,800 | 1,320,900 |
| 1867-68..... | 78,000 | 1,873,300 |
| 1868-69..... | 48,900 | 1,155,200 |
| 1869-70..... | 59,400 | 1,479,100 |
| 1870-71..... | 83,800 | 3,464,900 |
| 1871-72..... | 35,900 | 942,300 |
| 1872-73..... | 44,100 | 685,700 |
| 1873-74..... | 35,300 | 617,300 |
| 1874-75..... | 18,300 | 305,500 |
| 1875-76..... | 17,700 | 388,000 |
| 1876-77..... | 38,500 | 710,900 |
| Total, twelve years..... | 553,000 | \$13,839,600 |

The above covers the gross bullion product for a period of eleven years, which comprises nearly the entire official life of the present incorporation. We were in hopes to give the proportions of gold and silver in the above total, but have not the data for the first two nor for the last three years.

Proportions of gold and silver. From June 1, 1867, to May 31, 1874, a period of seven years, the proportions were as follows:

| | |
|-------------------------|--------------|
| Gold..... | \$3,908,500 |
| Silver..... | 6,314,300 |
| Total, seven years..... | \$10,222,800 |

Assuming the same result carried in the other five years, the product of the mine would show thirty-eight per cent. gold and sixty-two per cent. silver. Most of the large producing mines in the same county show a higher average in gold, some of them running from forty-five to fifty per cent. gold. In fact, the whole Comstock lode, so far as developed, has averaged over fifty per cent. in the superior metal. It is well to always bear this fact in mind when considering the yield of the Nevada silver mines.

The average yield of the ore of the Chollar-Potosi, together with the ordinary costs of mining and milling, have been as follows:

| Years. | Mining. | Milling. | Yield. |
|--------------|---------|----------|---------|
| 1866-67..... | \$4 48 | \$14 97 | \$25 73 |
| 1867-68..... | 4 24 | 14 75 | 24 14 |
| 1868-69..... | 4 30 | 13 15 | 23 70 |
| 1869-70..... | 3 99 | 12 81 | 24 86 |
| 1870-71..... | 4 69 | 12 00 | 41 30 |
| 1871-72..... | 2 38 | 12 16 | 26 17 |
| 1872-73..... | 2 93 | 11 90 | 15 57 |
| 1873-74..... | 3 84 | 12 44 | 17 47 |
| 1874-75..... | 4 00 | 12 00 | 16 65 |
| 1875-76..... | 4 20 | 11 83 | 18 03 |
| 1876-77..... | 3 99 | 11 00 | 18 69 |

The figures for mining are exclusive of the expenses for dead work, prospecting, etc. These outside disbursements have varied from two dollars up to twelve per ton on the quantity of ore milled. For the past year they amounted to seven dollars and eighty-eight cents per ton. In 1874-75 the mining, milling and other expenses, amounted to twenty-eight dollars and eighteen cents per ton. The actual cost of taking out ore, under favorable conditions, has varied from two dollars and thirty-eight cents to four dollars and forty-eight cents. Milling is now being done at eleven dollars per ton. The first dividend of the Chollar-Potosi was paid in May, 1867. For the past eleven years the following have been the assessments and dividends:

| Years. | Assessments. | Dividends. |
|--------------|--------------|-------------|
| 1866-67..... | | \$ 66,125 |
| 1867-68..... | \$182,000 | 353,200 |
| 1868-69..... | | 41,520 |
| 1869-70..... | | 420,443 |
| 1870-71..... | | 1,646,637 |
| 1871-72..... | | 252,000 |
| 1872-73..... | 140,000 | |
| 1873-74..... | | |
| 1874-75..... | 280,000 | |
| 1875-76..... | 280,300 | |
| 1876-77..... | 196,202 | |
| Total | \$1,358,502 | \$3,079,925 |

Adding the two hundred and eighty thousand dollars levied in December, 1865, the balance sheet between the mine and its stockholders is as follows:

| | |
|-------------------------------|-------------|
| Forty-four dividends..... | \$3,079,925 |
| Eleven assessments..... | 1,358,502 |
| In favor of stockholders..... | \$1,721,423 |

Of the forty-four dividends, twelve were paid in 1869-70, and seventeen in 1870-71. The Chollar-Potosi bonanza was a comparatively small one, and was worked out in less than two years. The last dividend was paid February 10, 1872, and the last assessment was levied May 14, 1877. Of the gross bullion twenty-five per cent. has been paid in dividends.

THE REQUA SHAFT.

This is one of the most important works in progress on the Comstock. It was begun early in the year 1875, and at present has reached a depth of about twenty-four hundred feet. The site is somewhat distant to the east of the original vein croppings, is central to the mining companies and is connected by a side-track with the Virginia and Truckee Railroad. The shaft is a model of engineering skill and design, and is the joint work of the Chollar-Potosi, Hale and Norcross, and Savage mines. By means of it, prospecting will be more vigorously carried on, and the water in the lower levels of the mine will be more easily removed. More

than a million dollars has already been expended in its construction, and its various equipments are of the most finished and substantial kind.

There are four compartments, that one for the pumps being six by seven feet, and the three for hoisting purposes being each five by six feet. All the machinery is in place, and has a capacity to continue the workings at least a thousand feet deeper than the depth at present attained. The pumping engine is a compound vertical engine of seven hundred horse power, and is capable of running a double column of fifteen-inch pumps four thousand feet. Its cost, together with its double column of pumps, two thousand feet, was four hundred thousand dollars. Considerable difficulty, in the lower workings, has arisen from the influx of water, and the amount lately raised has averaged from eighty to ninety thousand gallons per day. It is expected, however, that this trouble from water will be largely diminished on the completion of the great eastern drift on the 2000-foot level of the Hale and Norcross Mine. This drift is now in over eight hundred feet, and on the fifth day of January less than one hundred feet remained to be made. When connection is made with the Requa Shaft, the mining companies of the central part of the Comstock will be able to avail themselves of the advantages offered by the Sutro Tunnel. During the last week of 1878, the work progressed at the rate of eleven feet per day. When the water from the flooded mines has been pumped into this drift, it will be conducted into an immense tank at the bottom of the shaft. Then the pumps will lift it to the surface or to the drift in connection with the Sutro Tunnel. The completion of this pumping system will form a new era in the history of the flooded mines. It will lessen the extreme heat of the lower levels by a more thorough ventilation; it will remove the water at present so great as to interfere with the workings; it will insure the mines against any future repetition of the flood. It will make prospecting more easy, developments more valuable, labor more beneficial and thorough. The successful completion of the shaft itself, constructed at such a great cost of labor and wealth, will be one of the greatest engineering triumphs of the Comstock.

BULLION.

The work of exploration has been pushed vigorously ahead during the past year. The main incline shaft has reached a depth of two thousand two hundred and fifty-four feet, and the various drifts and cross-cuts have made good progress. A great deal of work has been done in the west cross-cut from the 2000-foot level. Repairs have been completed in this level, in the main north drift, and a branch drift has been started north from cross-cut cut No. 2, to connect with the main incline shaft. The bottom of the incline shaft is in porphyry and quartz; from the latter low assays are obtained. The money necessary for the work has been derived from assessments. The last assessment, one dollar per share, was levied December 3, 1878. Total assessments have been two million eight hundred and two thousand dollars.

The following is the Superintendent's annual report for 1878:

SUPERINTENDENT'S REPORT.

To the President and Trustees of the Bullion Mining Company—Gentlemen: Herewith I beg to hand you a statement of operations at the Company's mine for the year ending December 31, 1878. During the past year our prospecting has been confined to the 1700, 1840, 2150 and 2400-foot levels.

On the various levels worked, bodies of ore of a low grade have been found, which, however, would not pay for extraction.

Owing to the great heat and fear of water, work has been pushed forward under great difficulties in the 2040, 2150 and 2400-foot levels.

Three thousand four hundred and sixty-eight feet of drifts have been run in and to the mine during the year. This expenditure of labor and money was not rewarded by the finding of any ore body which it would pay to extract.

The main incline shaft has been sunk from sixty feet below the 1700-foot level to a depth of two thousand one hundred and thirty feet, making a total vertical depth of three hundred and seventy feet, or six hundred and forty-seven feet on the incline.

On the 1700-foot level four hundred and thirty-six feet of lateral drifts have been run north and south from the main incline. From these drifts three cross-cuts have been run two hundred and seventy feet across the vein.

On the 1840-foot level the main lateral drift has been extended one hundred and five feet; one cross-cut has been run to the eastward two hundred and twenty feet, and one to the west one hundred and twenty feet, to connect with the incline. Owing to encountering a heavy body of water work was suspended for the present on the level.

On the 2040-foot level a drift was run eighty-five feet to the east; this drift has been temporarily suspended, owing to the necessity of procuring the necessary ventilation, which will be attained as soon as the main incline shaft has been connected with the 2150-foot level of the Imperial mine. I expect to accomplish this by the latter part of this month.

On the 2150-foot level we have driven four hundred and fifty-five feet of lateral drifts. Three cross-cuts have been run from this drift, two to the east and three to the west, making the total number of feet one thousand and ten. From west cross-cut No. 2, a branch drift has been started to connect the incline, 2550-foot level (or 2400-foot level of Imperial). The combination drift of Bullion and Exchequer was started in a northerly direction on November 25, 1878, and has been run a distance of one hundred and three feet; at this point work had to be suspended, owing to a great influx of water. A branch drift has been started eighty feet back from the face, bearing to the west side of the vein, hoping thereby to avoid the water. This drift is now in a distance of seventeen feet in good working rock, without any sign of water.

I may here remark that the ground passed through, so far, shows many favorable prospects, the fissure or ledge formation being very wide and showing strong indications. This branch drift was absolutely neces-

sary on account of the steam from the water in the main drift being so hot that the faces of the workmen are scalded if exposed to it for any length of time.

Explorations will be continued in 2040-foot level and 2150-foot level as soon as the connection is made between the incline and the 2000-foot level.

The machinery for hoisting is in excellent condition and competent to do the work to the twenty-three hundred foot level, at which point another hoisting engine will be required to sink the incline to the twenty-five hundred foot level.

Protection of the works against fire has been secured by a complete system of water pipes, hydrants and hose, with a plentiful supply of water under heavy pressure.

With the expectation of soon overcoming all the impediments which have been hinted at above as having stood in the way of our operations in the mine, and that the necessary connections will soon be made for working the lower levels to advantage, I anticipate from present indications that the work of the present year will be crowned with great success.

Yours respectfully,

E. A. SCHULTZ, Sup't.

SECRETARY'S REPORT.

The following is the statement of the Secretary of the Bullion Mining Company of the receipts and expenditures of the Company from January 12, 1878, to January 4, 1879:

Receipts.

| | | | |
|--|----|---------|--------------|
| Amount on hand in Anglo-California Bank, January 12, 1878..... | \$ | 999 | 38 |
| In Superintendent's hands, January 12, 1878..... | | 3,628 | 38 |
| From assessment No. 6..... | | 100,000 | 00 |
| From assessment No. 7..... | | 150,000 | 00 |
| From assessment No. 8..... | | 41,150 | 00 |
| Bills receivable, Derby note..... | | 100,000 | 00 |
| Virginia & Truckee R. R. rebates..... | | 3,344 | 81 |
| Sale of old machinery..... | | 600 | 00 |
| Exchequer Mining Company..... | | 15,000 | 00 |
| Superintendent's overdraft, Virginia agency | | | |
| Bank of California..... | | 1,865 | 12 |
| Amount from sundry receipts..... | | 1,651 | 85 |
| | | <hr/> | <hr/> |
| | | | \$418,232 54 |

Expenditures.

| | | |
|--|--------------|--------------------|
| Paid Merchants' Exchange Bank overdraft on old account..... | \$ 14,917 26 | |
| Bills payable bal. of old notes of Bank of California, Anglo-California Bank and A. Weill..... | 95,007 61 | |
| | | <hr/> \$107,942 87 |
| Office expense..... | \$ 1,342 33 | |
| General supplies..... | 19,483 49 | |
| Stationery..... | 1,142 37 | |
| Hardware..... | 5,098 60 | |
| General expense..... | 10,164 14 | |
| Interest and exchange..... | 22,697 40 | |
| Bullion-Exchequer drift..... | 29,144 38 | |
| Exchequer Mining Company..... | 26 00 | |
| Santiago Mining Company..... | 360 00 | |
| Wood account..... | 15,354 00 | |
| Lumber account..... | 4,129 36 | |
| Salary account..... | 6,595 80 | |
| Stock account..... | 457 50 | |
| Labor..... | 63,471 00 | |
| Twenty-four hundred foot level drift..... | 1,757 50 | |
| 2000-foot level drift..... | 36,511 85 | |
| Water..... | 2,600 00 | |
| Machinery..... | 2,541 37 | |
| Legal expense..... | 4,675 00 | |
| Coal account..... | 240 51 | |
| | | <hr/> \$227,792 60 |
| In Bank of California, January 4, 1879..... | \$ 16,690 00 | |
| In Treasurer's account, January 4, 1879..... | 62,668 18 | |
| Cash on hand in office, January 4, 1879..... | 1,156 89 | |
| | | <hr/> \$ 80,515 07 |
| Total..... | | <hr/> \$418,232 54 |

CONSOLIDATED IMPERIAL.

This mine joins the Bullion. It embraces all the claims between the Yellow Jacket and Bullion except the Challenge and Confidence. On the first day of April, 1876, the consolidation of these claims was effected, and the number of shares was increased to five hundred thousand. The Imperial claim furnished the greatest number of feet in the consolidation, the Empire, Bacon, Eclipse, Consolidated Gold Hill Quartz, French and Bowers, furnishing a less number in the order named. The entire number of feet being four hundred and sixty-eight, the number of shares per foot is one thousand and sixty-eight and three-eighths. The money necessary for carrying on the work of development has been mainly derived from assessments. Up to April, 1878, the total assessments aggregated six hundred and seventy-five thousand dollars, while the bullion yield has been about one-fifth of that sum.

The work lately has been mainly on the 2400-foot level, and the sinking of the joint Alpha winze below that level has made the best of progress. The south winze has been going steadily forward, the bottom in a mixture of quartz and vein matter of a very favorable character. The various drifts, cross-cuts and winzes throughout the mine are looking well, and some favorable developments in the future are expected. Considerable difficulty in the working is experienced from the influx of water, but thus far the pumping apparatus and machinery has been equal to the emergency. Recently the defective portions of the shaft and machinery have been overhauled, and wherever repairs were needed the same have been promptly made. The lower levels are for the most part free from impure air, and the general outlook is encouraging.

YELLOW JACKET.

The more recent workings of this company have been directed to the sinking of the new shaft and to the prospecting of the lower levels. The different drifts, winzes and cross-cuts have been pushed forward with considerable energy, and the various explorations have been made on a most satisfactory and systematic scale. In the old shaft a winze has been extended from the 2200 to the 2400-foot level. On the former level the east drift has been run to a point directly beneath the new shaft. The surface of the new shaft being ninety-two and forty-eight hundredths feet higher than the old one, the terminus of this drift is two thousand two hundred and ninety-two and forty-eight hundredths feet vertically below the surface. On the 2400-foot level the main drift south is in over five hundred feet, the material in face being vein porphyry with streaks of quartz and clay. On the 200-foot level a drift has been run from the south winze and connected with drift from the Crown Point incline. A connection was also made below with Consolidated Imperial for ventilation. Other drifts and cross-cuts have been run, and some good indications of ore have been found.

The new shaft is situated twenty-six hundred feet east of the old one. Its site is one of the most convenient on the Comstock. It has four working compartments, each five feet by six and one half, and a pumping compartment six and one half feet by seven and one half. The shaft is timbered in the most complete manner, and the hoisting and pumping machinery are of the most powerful and improved kind. At the present writing the depth attained is two thousand and twenty-eight feet, and the bottom is in hard blasting rock. The distance to the terminus of the drift directly underneath is two hundred and sixty-four feet. When connection is made with this drift the mine will be one of the best ventilated on the lode. The total assessments levied on the Yellow Jacket have aggregated three million seven hundred and ninety-eight thousand dollars, and the dividends paid have aggregated two million one hundred and eighty-four thousand dollars. This latter amount is small when it is considered that the bullion yield has been about fourteen and one half million dollars. The receipts at the present time are derived mainly from assessments.

CROWN POINT.

A great deal of work has been done in this mine during the past two years. The lower levels have been extensively prospected, and from the older workings of the upper levels a considerable amount of ore has been obtained. The expense of working the mine will in the future be materially lessened, as the pumping, hoisting, etc., will be done through the shaft put down in connection with the Belcher Company. This shaft is supplied with excellent hoisting works, is substantially timbered, and will meet every requirement of the mines. The total assessments have been one million nine hundred and fifty-three thousand three hundred and seventy dollars, while the total dividends have been eleven million eight hundred and ninety-eight thousand dollars. The bullion yield has been twenty-nine million seven hundred fifty-three thousand one hundred and nineteen dollars and forty-eight cents. The superintendent's last annual report gives the following in regard to the work which has been done.

SUPERINTENDENT'S REPORT.

At the date of the last annual report the vein on the 2000-foot level had just been tapped and considerable hot water encountered. Since then the vein from this point has been prospected in an easterly direction two hundred and fifty feet. The first one hundred and fifty feet consisted of lively-looking quartz, giving assays of from five to ten dollars per ton. At this point the formation changed from clay to porphyry, with occasional stringers of quartz. And after running about one hundred feet through this formation, what seemed to be the east wall was encountered, and work in this direction was discontinued. A drift was then started in a southerly direction, for the purpose of making connection with Belcher and Crown Point pump shaft, and was run five hundred and forty-five feet before connection was made, two hundred and forty-five feet of which was run through Belcher Company's ground. Owing to the intense heat and want of ventilation in this drift it was impossible for men to work there more than a few minutes at a time, and as it was of the utmost importance to secure good ventilation as speedily as possible, by connection with the pump shaft, it became necessary to employ relays of men, that the work might be pushed to an early completion. During the progress of this drift, and of the east cross-cut, all the water encountered on this level had to be pumped by compressed air to the 1700-foot level, and thence conducted to the joint pump shaft. It will be remembered that at the date of the last annual report, the north-east drift on this level had been extended a distance of one hundred and fifty feet, when it was discontinued temporarily on account of our near approach to the ledge and the fear of a heavy flow of water, which, with our inadequate pumping facilities, we could not handle; but since connection by our south drift was made with the pump shaft, work was resumed at this point by turning the drift to the eastward enough to cut the stratification of the ledge at right angles; in other words, a true cross-cut was run a distance of three hundred feet, two hundred feet of which was through quartz of a low grade, assaying from four to ten dol-

lars per ton. But the last one hundred feet was considerably mixed with porphyry and became very hard, and believing that the eastern boundary of the vein had been reached, further work was discontinued. This drift also was exceedingly hot, and the character of the ground was such that it required careful timbering. At the point where the north-east drift on this level was turned to the eastward to run at right angles with the vein, a drift was started in a due north course to meet a similar drift being run south by the Yellow Jacket Company, and was extended by us a distance of one hundred and sixty feet before connection was made. The ground through which this drift was run was of such a nature that it required thorough timbering throughout, which was done in a very substantial manner. The general character of this level shows great improvement over the last level prospected—the 1700.

Where the ore body gave out on the upper levels, the walls flattened to an angle of about twenty degrees. This level shows that the walls have again straightened up to their old pitch of about forty-five degrees, which I regard as a favorable indication of returning strength of vein, and a promise of another ore body making in the near depth. From the facts, also, that on this level the quartz is much freer from porphyry, is of a livelier character, yields better assays and is much more regular in its stratification, I am strengthened in the belief that by an energetic prosecution of work in the still greater depths, we will be rewarded by the discovery of another paying body of ore.

As no ore of a paying quality was found on the 2000-foot level, we deemed it best for economic reasons, to sink a winze below this level, instead of the incline. We therefore started a double compartment six by ten foot winze, at a point one hundred and twenty feet north of our south line, in our regular north and south drift, and have sunk it to the depth of two thousand three hundred feet, or five hundred and twenty-five feet on the slope, below the 2000-foot level. We are now engaged in cutting out a station at this point, preparatory to running south to connect with the pump shaft, for the economical handling of any water we may encounter in developing this level, and for the purpose of ventilation.

It is also the intention to run a drift from this point in a northerly direction along the course of the vein, to about the northern boundary of the mine, and when this work is completed, and connection with the pump shaft shall have been made, the intention then is to run a series of cross-cuts across the vein at various points, to determine the value of this level.

Believing that ore in paying quantities could be found in the old workings on the upper levels of the mine, various old drifts were cleaned out and repaired and new ones run. At a point about one hundred feet south and a little west of the shaft, on the track floor of the 160-foot level, we uncovered a small body of fair ore, about sixty feet long, and of an average width of eight feet.

From this point it was traced up about thirty feet, where it pinched out. A winze was then sunk in the vein to the 230-foot level, and at the same time a drift was run from the 230-foot station to connect with it.

The ore body between the 160 and 230-foot levels gradually narrowed as it approached the 230-foot level, not being more than two to four feet wide, though it increased to one hundred and twenty feet in length. Nor was the ore of so high a grade as on the 160-foot level. From the 230-foot level a winze was sunk to the 300-foot level. At a point about thirty-five feet below the sill floor, we came into old workings, but the winze was extended down, and a drift run from the 300-foot station to connect with

it for the purpose of ventilation. The vein maintained about the same proportion and quality it had on the 230-foot level. We extracted from these workings seven thousand eight hundred and twenty-nine and one quarter tons of ore, which produced one hundred and thirty-three thousand five hundred dollars and seventy-six cents. Notwithstanding that the grade of the ore was rather low, it will be found that its extraction and milling was a benefit to the mine, when it is considered that the ore was very free from waste and required no assorting; and that the nature of the ground was such that scarcely any timbering was necessary, and the drifts being cool and near the surface, but few men and no extra fuel were required for breaking it down and hoisting it to the surface.

All this work was done west of the shaft, and from our maps and other sources of information, we found that no work had been done in this direction below the 400-foot level, all work done below that level being east of the shaft. We, therefore, ran a drift from the 500-foot station, a little south of west for a distance of two hundred feet, and encountered the west country, when it was discontinued. We then came back to a point one hundred feet west of the shaft, and started a drift in a southerly direction for the purpose of thoroughly exploring this level. When it had been extended two hundred and sixty-five feet, we unexpectedly struck a very heavy flow of water, about fifty inches miners' measure, which compelled us temporarily to suspend work. As soon as the flow of water abated sufficiently, we resumed work, and discovered a formation very promising in its character consisting of clay and porphyry, with occasional stringers of quartz of a low-grade. The water continues to flow uninterrupted, though much diminished in volume. From the large quantity of water which has already flowed from this level, and the quantity now running from it, I am convinced that we will yet encounter here, quite a large, and we hope, productive body of quartz.

Following is a statement of drifts, etc., run on the various levels during the last year:

| | | |
|----------------------|--|-----------|
| 160-foot level..... | Old drifts cleaned out and repaired..... | 965 feet |
| 160-foot level..... | Cross-cut and new drifts run..... | 211 feet |
| 160-foot level..... | Raises made and winzes sunk..... | 60 feet |
| 230-foot level..... | Old drifts cleaned out and repaired..... | 510 feet |
| 230-foot level..... | Cross-cuts and new drifts run..... | 480 feet |
| 230-foot level..... | Raises made and winzes sunk..... | 290 feet |
| 300-foot level..... | Old drifts cleaned out and repaired..... | 315 feet |
| 300-foot level..... | Cross-cuts and new drifts run..... | 220 feet |
| 300-foot level..... | Raises made and winzes sunk..... | 225 feet |
| 500-foot level..... | New drifts run..... | 570 feet |
| 2000-foot level..... | Drifts and cross-cuts run..... | 1255 feet |
| 2000-foot level..... | Winze sunk to 2300-foot level on slope.... | 525 feet |

In addition to the work done on the various levels enumerated above, the incline for its entire length has been kept in good repair, and is now in prime condition to handle any ore which may be discovered in the lower levels. The shaft likewise has been kept in thorough repair, a considerable portion of it having been retimbered. We have also brought and put in place, at considerable expense, a new No. 7 air compressor; also, an air hoisting engine has been purchased, and put in position at the mouth of the winze on the 2000-foot level, for the purpose of sinking the

winze below that level, and all the machinery in and about the mine has been kept in good order, and is now running smoothly. The company's mill, the Rhode Island, is in good condition. It is now running on California Company's ore, having been rented since July, 1877, to the Pacific Mill and Mining Company for fifteen hundred dollars per month. At the date of the last annual report, the Belcher and Crown Point pump shaft and incline had attained a depth of nineteen hundred and fifty feet. During the past year it has been sunk through hard blasting ground six hundred and ninety-seven feet on the slope or to the 2360-foot level, and as soon as the incline shall have been sunk deep enough for a sump, a drift will be run in an easterly direction to cut the ledge. A drift will also be started in a northerly direction to meet a drift which will be run from the bottom of our winze on the 2300-foot level, and meanwhile the incline will be sunk to greater depths. A commodious station has been excavated at the 1960-foot level, and a drift has been run east three hundred and sixty feet through very hot and expensive ground, and the ledge cut. A waste chute has also been sunk from the station, opening into the incline below.

On the 2160-foot level a station has also been cut out and a waste chute sunk the same as on the 1960-foot level, and a drift run east four hundred feet and the ledge tapped. Beside the work enumerated above, there have been during the past year three hundred feet of the shaft and fifty feet of the incline retimbered. There has been put in place a balance-bob complete on the 2160-foot station. Guides have been put in the incline from the 1400-foot level to the bottom. Two plunger pumps, complete, have been put in, one on the 1960 and one at the 2160-foot levels.

The V-bob at the 1000 station, and pump, engine and condenser have been thoroughly overhauled and repaired at considerable expense.

Mill's generators have been attached to two sets of boilers, thus making a saving in the consumption of fuel of at least ten per cent.

A new incline car with safeties has been built, and one Ingersoll drill and donkey pump with pipes, both complete, have been bought and paid for, besides other additions and improvements too numerous to mention.

For a statement in detail, of the receipts and expenditures of the mine for the past year, I refer you to the report of the Secretary.

Respectfully yours,

S. L. JONES, Superintendent.

SECRETARY'S REPORT.

*Receipts.**Mine Expense.*

| | | |
|---|-------------|--------------|
| Material sold | \$ 2,293 74 | |
| Yellow Jacket Mining Company, one half of tramway expense | 745 61 | |
| Work for Kentuck Mine | 178 50 | |
| Compressed air to Belcher and Crown Point Shaft | 9,294 75 | |
| Virginia and Truckee R. R. and Yellow Jacket M. Co., expense of water tank | 72 76 | |
| | <hr/> | \$ 12,585 36 |

Rhode Island Mill.

| | | |
|--|--------------|-----------|
| Rent of mill from July, 1877, to May, 1878 ... | \$ 14,200 00 | |
| Castings sold | 443 54 | |
| | <hr/> | 14,643 54 |

Assessments.

| | | |
|------------------------------------|------------|------------|
| Balance of Assessment No. 30 | 69,101 53 | |
| Assessment No. 31 | 100,000 00 | |
| Assessment No. 32 | 100,000 00 | |
| Assessment No. 33 | 100,000 00 | |
| | <hr/> | 369,101 53 |

General Expense.

| | | |
|---|----------|--|
| Advertising shares on delinquent stock, etc | 2,498 70 | |
|---|----------|--|

Bullion.

| | | |
|-------|------------|--|
| | 133,500 76 | |
|-------|------------|--|

Samuel L. Jones.

| | | |
|-----------------------------------|----------|--|
| Balance on hand May 1, 1877. | 1,040 14 | |
|-----------------------------------|----------|--|

Cash Overdraft.

| | | |
|-------------------|-----------|--|
| May 1, 1878. | 41,887 83 | |
|-------------------|-----------|--|

Discount.

| | | |
|--|--------|--------------|
| On coin sold here and at Gold Hill | 133 49 | |
| Total | <hr/> | \$575,391 35 |

*Disbursements.**Mine Expense.*

| | | |
|--------------------------------|--------------|--------------|
| Labor..... | \$129,764 18 | |
| Wood, lumber and charcoal..... | 60,736 61 | |
| Oils, tallow and candles..... | 6,150 77 | |
| Water and ice..... | 8,224 34 | |
| Surveying..... | 700 00 | |
| Powder, caps and fuse..... | 6,531 59 | |
| Fulton Foundry..... | 487 16 | |
| Sundry supplies..... | 3,906 28 | |
| Machinery..... | 12,044 51 | |
| | <hr/> | \$228,545 44 |

Milling.

| | |
|-----------------------------------|-----------|
| 7,828½ tons of ore at \$9 12..... | 71,467 64 |
|-----------------------------------|-----------|

Legal Expense.

| | |
|-------|----------|
| | 4,366 00 |
|-------|----------|

San Francisco Expense.

| | |
|--------------------------------------|----------|
| Salaries, rent, stationery, etc..... | 9,775 21 |
|--------------------------------------|----------|

Taxes.

| | |
|-----------------------------|----------|
| City, County and State..... | 3,547 51 |
|-----------------------------|----------|

Transportation of Bullion.

| | |
|-------|-------|
| | 53 35 |
|-------|-------|

General Expense.

| | | |
|---|-------------|--------------|
| Salaries and office expenses at Gold Hill..... | \$11,547 56 | |
| Advertising delinquent stock, listing stock, etc..... | 4,967 36 | |
| | <hr/> | \$ 16,514 92 |

Discount.

| | | |
|---------------------|--------------|-----------|
| On bullion..... | \$ 11,277 66 | |
| On silver coin..... | 1,444 22 | |
| | <hr/> | 12,671 88 |

Interest and Exchange.

| | |
|-------|----------|
| | 8,220 10 |
|-------|----------|

Assaying.

| | |
|-----------------------|----------|
| Bullion and ores..... | 1,696 82 |
|-----------------------|----------|

Belcher and Crown Point Shaft.

| | |
|--|-----------|
| One third of the expense for year..... | 83,189 61 |
|--|-----------|

Insurance.

| | |
|-----------------------------|----------|
| On works and machinery..... | 5,995 00 |
|-----------------------------|----------|

Samuel L. Jones, Superintendent.

| | |
|----------------------------------|-------|
| Balance on hand May 1, 1878..... | 35 05 |
|----------------------------------|-------|

Cash Overdraft.

| | |
|------------------|------------|
| May 1, 1877..... | 129,153 27 |
|------------------|------------|

Loss.

| | |
|---|--------|
| On stock sold by resolution passed at last annual meeting.. | 159 55 |
|---|--------|

| | | |
|------------|-------|--------------|
| Total..... | <hr/> | \$575,391 35 |
|------------|-------|--------------|

Ore Statement.

7,828½ tons (average per ton \$17 03), value..... \$133,500 76

Bullion Statement.

Stamped value of bars as per assay certificates received at the office of the company in San Francisco, and credited on the books.

| | | |
|-----------------------------|-------------|--------------------|
| Value in gold..... | \$40,906 93 | |
| Value in silver..... | 92,109 38 | |
| Assay grains and chips..... | 484 45 | |
| | | <hr/> \$133,500 76 |

Assets.

| | | |
|--|--------------|--------------------|
| Mine Improvement..... | \$163,631 53 | |
| Rhode Island mill..... | 80,000 00 | |
| Real Estate..... | 15,000 00 | |
| Assay Office..... | 2,533 27 | |
| Supplies on hand at mine..... | 2,951 40 | |
| Belcher-Crown Point shaft, one third cost.... | 280,936 23 | |
| Cash on hand at Gold Hill..... | 35 05 | |
| Mine expense due from Belcher and Yellow Jacket..... | 1,763 90 | |
| Cash on hand at San Francisco office, May 1.. | 573 48 | |
| | | <hr/> \$574,424 86 |

Liabilities.

| | | |
|---|-----------|-------------------|
| Belcher M. Co. one third expense of pump shaft for April..... | 6,983 67 | |
| Overdraft at Bank of California, May 1, 1878 | 42,451 35 | |
| | | <hr/> \$49,445 02 |

BELCHER.

Until the discovery of the great bonanza in Consolidated Virginia and California, the Belcher was the leading mine on the Comstock. During the years 1873 and 1874, it was the most productive mine then known in the history of the world. The great Belcher bonanza was found between the 1000 and 1500-foot levels. During the past two years a great deal of systematic prospecting has been done—drifts, cross-cuts and winzes have been made, and a considerable amount of good ore has been obtained. The workings are at present the deepest on the Comstock, the incline shaft having reached a depth of two thousand six hundred feet. The indications for important developments in the near future are good. Assessments have been levied amounting to one million four hundred ninety-two thousand four hundred dollars, and the dividends paid aggregate fifteen million three hundred and ninety-seven thousand two hundred dollars. The total bullion yield has been thirty-four million two hundred thirty-eight thousand eight hundred and thirty-nine dollars and twenty-six cents.

The reports of the Superintendent and Secretary give a very exhaustive review of the workings during the past year.

SUPERINTENDENT'S REPORT.

During the year ending December 31, 1878, there was considerable work done in the old workings of the mine for the purpose of searching for any ore which might have been overlooked during the previous working of these levels; but without any satisfactory results.

In addition to this work, the winze from the 1600-foot level has been continued a distance of twenty-eight feet down to the 1900-foot level.

On the 1900-foot level from the bottom of this mine, a drift was run east a distance of eighty-four feet, passing through a body of quartz forty feet wide. To connect with the main south drift on this level, this main shaft had to be continued a length of one hundred and seventy-eight feet before this connection could be made, which being made, furnished us with good ventilation for prospecting this level. Another drift was run west on this level to connect with old incline a distance of one hundred and sixty-two feet, and passing through thirty-five feet of good looking quartz. From the extreme end of this drift an upraise was made a height of ninety-eight feet and a connection made with bottom of old incline. The connection drained off the water from the old incline, and did away with the expense of running the donkey pump at the 1600-foot level, which it was necessary to keep steadily running in order to keep the water below this (1600-foot) level.

A south-east drift was also run on this level a length of eighty-two feet. In this drift a station (19x25x12 feet) was opened, an engine put up and a winze started. This winze was sunk a depth of three hundred and seventy-nine feet down to the 2160-foot level.

On the 2160-foot level a main south drift was run a length of six hundred and seven feet, and a west cross-cut was made from bottom of winze to connect with this south drift. This cross-cut was one hundred and sixteen feet in length, and passed through a body of good looking quartz forty feet wide. A drift was also run west on this level a distance of thirty-five feet, and a chute constructed for the purpose of continuing the winze down to the 2360-foot level. This winze is now down eighty feet below the 2160-foot level, and will in time connect with the main south drift, which is being driven on the 2360-foot level, and which is now in a distance of four hundred and fifty-three feet.

On the 2360-foot level two cross-cuts were made. Cross-cut No. 2 was extended a distance of seventy-five feet, and passed through a body of quartz thirty-five feet wide. Cross-cut No. 3 was continued one hundred and thirty-seven feet, passing through one hundred and thirty feet of good looking quartz. From the general appearance of these cross-cuts, I am strongly inclined to believe that something of value will be encountered on the 2560-foot level, which we are at present opening out.

The improvements in the mine during the year have been as follows: On the 1900-foot level three hundred and seventy-six feet of one and one quarter inch pipe were put in for the purpose of running the donkey engine at the top of the winze. There were also eight hundred and forty-six feet of one and one half inch pipe laid for the purpose of running the diamond drill, which was used for tapping the water at the bottom of the old incline. One hundred feet of four-inch pipe were put down to convey the water from bottom of old incline to the pump-shaft. A blower was put up, and three hundred and ten feet of one and one half-inch pipe

laid in order to furnish air while running the 1900-foot east drift. A fourteen-inch air-pipe was taken out of the north incline and put in the south incline, and also through the drift on the 1900-foot level to the winze—a distance of seven hundred and ten feet. A six-inch air-pipe leading from the surface was continued from the 1600-foot level to the 1900-foot level, and through the 1900-foot drift to the north incline, and down the north incline to the 2360-foot level—a total distance of two thousand one hundred and twenty feet. A donkey engine and two air receivers were also put up on the 1900-foot level for the purpose of furnishing air to this level.

On the 2360-foot level a blower, together with a five and a half foot fan, were put up to give ventilation while making our cross-cuts on this level.

On the surface the improvements have been: New sills under the hoisting works, a new roof on the main building, besides putting all our tracks, etc., in good repair.

A summary of the work done at the old works will show that two thousand and ninety-eight feet of drifts have been run, and five hundred and eighty-five feet of winzes and upraises have been made besides the improvements mentioned above.

PUMP SHAFT.

The incline portion of the pump shaft has been sunk and timbered a distance of six hundred and twenty-five feet, and is now thirty-six feet below the 2560-foot level.

At the 2160 and 2360 stations, each sixty feet by sixteen feet, have been opened out and timbered. On the 2060 level an east drift directly opposite the main incline was run a distance of two hundred and twenty-three feet, passing entirely through the vein, but without meeting with any encouraging results.

On the 2160 level an east drift was run a distance of two hundred and twenty-six feet, forty-seven feet of which passed through well-defined quartz. An excavation for a tank thirty feet long by thirteen feet deep and twelve feet wide was cut out and a tank put in place. A fourteen-inch pump was also put up.

On the 2360 level an east cross-cut from the station was run a distance of two hundred and seventy-five feet, the first one hundred feet of which passed through porphyry. Then came fifteen feet of broken quartz, and the remainder ran through east-country ground.

A north drift was run a distance of one hundred and fifty-one feet to connect with a drift coming south from the bottom of Crown Point winze. This drift was run for the double purpose of ventilation and of conveying the Crown Point water to the pump shaft. From this lateral drift a joint cross-cut was made on the line between Crown Point and Belcher, and continued a length of one hundred and fifty feet, the first one hundred feet of which passed through porphyry. Then thirty-five feet of quartz was shown up, and the remainder ran through east-country ground. An excavation for a tank of the same dimensions as that at the 2160 level was made and the tank put in; also a fourteen-inch pump was put in place. The chutes at the 1600 and 1900 levels were both enlarged, and two new ones, each 16x9x7 feet, were put in, one at the 2160 level and the other at the 2360 level. A balance-bob was put in at the 1900 station,

and the pumps were continued from this down to the 2360 level. A blower was put up at the 2060 level to furnish air for sinking the incline. Another was put up at the 2360 level to furnish air while making our cross-cuts on that level. From the 2060 to the 2360 level, five hundred and twenty feet of thirteen and fourteen-inch air-pipe were put in. A donkey pump was placed at this station, and three hundred feet of pipe laid to convey the water from Crown Point. There was also a drain two hundred and ninety-seven feet long cut out, and five-inch boxing put in two hundred feet of this drain to convey the water from Crown Point into the pump shaft. The whole of the north drift for a distance of two hundred and sixty feet was retimbered, and two air receivers put up. At the 850 station a chute was built for the purpose of taking away the dirt from the easing of the 500 and 700 bob-pits, and forty feet of the vertical portion of the shaft were retimbered. In the incline portion of the shaft from the 1500 to the 2560 station the main track was moved for a distance of one thousand seven hundred feet, in order to make room for posts, to which were fastened the guides for the safety car. These posts and guides were put in, a safety car built and put in, and a ladder-way constructed for the above distance, in order to have a passage-way for the men in going or coming from their work in case of accident to the incline, car or any part of the machinery.

A full line of donkey pumps run by compressed air, reaching from bottom of incline to the 1600 level, and one thousand one hundred and eighty-eight of eight-inch column, together with eight hundred and seventy-five feet of eight by ten boxing on the 1600 level have been put in place. These pumps are for the purpose of raising the water up to the 1600 level, and thence through into Overman; in order that the Company could take the water in case of any accident to our pumps or machinery. A bob-pit, thirty-three feet long, twelve feet wide and nineteen feet high, at the 850 station, was also cut out and timbered. The bob is ready to be put in place.

A summary of the work done at the Belcher and Crown Point pump-shaft shows six hundred and twenty-five feet of main incline sunk and timbered, and six hundred and fifty-two feet of drifts run and timbered, besides the improvements mentioned above. There is of material on hand, consisting of lumber, wood, coal, candles, oils, etc., the equivalent of, as follows:

| | |
|---|-------------------|
| Belcher old works..... | \$1,976 50 |
| Belcher and Crown Point pump-shaft..... | 6,570 90 |
| Total | <u>\$8,547 40</u> |

SECRETARY'S REPORT.

Receipts.

| | |
|--|---------------------|
| Due from Superintendent, January 1, 1878..... | \$ 1,868 27 |
| Crown Point joint shaft..... | 99,919 34 |
| Suspense account (dividend checks unpaid)..... | 485 60 |
| Assessments | 424,448 00 |
| Balance unpaid January 28, 1878. | |
| On No. 12..... | \$ 8,448 |
| On No. 13..... | 104,000 |
| On No. 14..... | 104,000 |
| On No. 15..... | 104,000 |
| On No. 16..... | 104,000 |
| Overdraft Bank of California..... | 30,255 84 |
| Total | \$556,977 05 |

Disbursements.

| | |
|---|---------------------|
| Due Bank of California, January 28, 1878..... | \$48,279 92 |
| Office and general expense—city..... | 9,537 39 |
| Mine expense..... | 46,933 40 |
| Lumber..... | 4,921 40 |
| Wood | 65,760 00 |
| General expenses—Gold Hill..... | 9,802 55 |
| Legal expenses..... | 4,200 00 |
| Exchange on drafts | 2,174 40 |
| Assaying.... | 429 00 |
| Labor | 119,290 00 |
| Discount on silver..... | 754 42 |
| Freight..... | 1,921 95 |
| Taxes | 1,301 86 |
| Interest | 6,226 77 |
| Insurance..... | 5,180 00 |
| Joint air shaft..... | 229,760 42 |
| Cash in hands of Superintendent..... | 500 57 |
| Total..... | \$556,977 05 |

OVERMAN.

The work latterly has been mainly confined to prospecting on the 1600-foot level and to the sinking of the new shaft, which is situated at considerable distance to the east of the old workings. The new hoisting works are in good condition. A large ore house has been erected, and to it a side-track from the Virginia and Truckee Railroad has been laid. The Overman joins the Segregated Belcher on the south. The number of shares in this mine is thirty-eight thousand four hundred, and the

number of feet twelve hundred. Forty-two assessments have been levied, aggregating two million nine hundred and fifty-one thousand six hundred dollars; the last one September 6, 1878. The bullion yield has been one million five hundred eighty-one thousand four hundred and eighty-seven dollars.

CALEDONIA.

This mine joins the Overman on the south. Rich developments in other mines from time to time have had their influence upon the stock of Caledonia, but in this mine no very important developments have yet been made. The money necessary for carrying on the work has been gained principally from assessments, and the entire amount realized by assessments has been more than four times the amount of the bullion yield. During the past two years the work of prospecting and developing the lower levels has been carried steadily forward, and some good results have been obtained. About the first of November, 1878, the main north drift on the 1600-foot level was connected with the south drift of Overman on same level, and a much better circulation of air has since been the result. About the same time the joint winze on the south line of the Overman was connected with the 1600-foot level drift. The work since then has more or less satisfactorily progressed, and the prospects for the future are encouraging. The number of feet on the vein is two thousand one hundred and eighty-eight, and the number of shares per foot is forty-five. The last assessment was levied in November, 1878. The total amount realized by assessments to date is one million five hundred and forty thousand dollars. The bullion yield has been in round numbers three hundred and fifty-thousand dollars. The capital stock is ten million dollars.

ALTA.

Prospecting has been vigorously carried forward in this mine during the past year. On the different levels from the one thousand and fifty to the fifteen hundred and fifty lateral drifts have been run, and these drifts occasionally dipping into the vein have shown some good ore. The dump is now full of excellent ore, and the extraction of the same has been stopped, preparatory to milling, which will shortly be commenced. The number of shares in the mine is one hundred and eight thousand, and the number of feet is six hundred. The money for prospecting has been mainly derived from assessments, the last assessment of one dollar per share having been levied in December, 1878. The total assessments have been nine hundred and ninety-one thousand five hundred and fifty-four dollars.

The usefulness of this mine has been more or less impaired in the past by expensive litigation. Being the leading mine on the south end or Devil's Gate District, its claim at times has been violently opposed, and several hundred thousand dollars have been spent in compromising with adverse claimants. The title has, however, been finally perfected, and no trouble in the future from this source may be expected. The machinery is of the most improved kind; the shaft, hoisting and pumping apparatus are in good order; the management is economical, the developments are favorable, and the outlook for the future is altogether encouraging.

JUSTICE.

In December, 1877, a complete change was made in the management of this mine. A committee was appointed to examine into the affairs of the Company, and in the following May a report derogatory to the management of the former Directors was made. A new Superintendent having been appointed, a more economical system of mining and milling was adopted, and latterly more satisfactory results have been obtained. The mine is well supplied with hoisting works, pumping machinery and the other necessary apparatus for prospecting and for extracting and working the ores, but the ores themselves have been of such low grades that the proceeds have been used in meeting the necessary expenses. The ore of late has been of fair grade, and more than sufficient to keep the Papoose Mill running. The prospecting drifts and cross-cuts have made good headway, and the work everywhere is being pushed vigorously forward.

The number of feet on the vein is twenty-one hundred; the number of shares per foot is fifty, making the total number of shares in the mine, one hundred and five thousand. The capital stock is ten million five hundred thousand dollars. Twenty-six assessments have been levied, the last, of one dollar and fifty cents per share, having been levied in August, 1878. The total assessments have aggregated in round numbers, two million six hundred and fifty-eight thousand dollars. The yield of bullion has not been far from three million dollars.

WASHOE COUNTY.

There has been a marked advance in all classes of business and industrial pursuits in this county during the past two years. Property has increased in value, and substantial improvements have been made. The developed resources of the county are principally agriculture, though a large revenue is derived from the wood trade. Owing to the plentiful supply of water obtained from the Truckee River and other mountain streams, there is no lack for irrigating purposes, and as a consequence there has been a great increase in the number of acres cultivated. Twenty-six ditches have been constructed, which supply the water for irrigating nearly twenty thousand acres of land. Twenty-four thousand bushels of wheat, barley and oats, were produced during the year 1878. The cultivation of alfalfa has been very successful, and adds much to the value of the farming lands in this county. Many fruit trees have been planted, which bear abundant crops. While but little mineral wealth has ever been produced here, yet cinnabar, gold, silver, copper and lead are found in paying quantities. During the last year, three hundred and sixteen tons of ore were worked, from which good results were obtained. The assessed value of real estate for 1878 was two millions five hundred and four thousand nine hundred and eight dollars, and that of personal property, one million two hundred and ninety-four thousand one hundred and sixty-seven dollars, making a total of three millions seven hundred and ninety-nine thousand and seventy-five dollars. The estimated population is five thousand. One thousand four hundred and thirteen votes were polled at the last election. The *Reno Gazette* gives the following concerning the mines of this county:

PEAVINE DISTRICT.

THE CONSOLIDATED POE MINING COMPANY.

This company has two mines, the Paymaster ledge and the Poe ledge. It has spent over two hundred thousand dollars in developing the mines, building hoisting work, a ten stamp mill, and a large furnace. A considerable amount of good ore has been extracted from the mines. The mines had been developed up to the point of showing good prospects when financial embarrassment set in, and active work was subsequently suspended. Capitalists are now having the mine examined by an expert, and upon a favorable report, will start them up again.

GOLDEN FLEECE MINE,

In the same district, has been extensively worked, and developed a well defined true fissure ledge. A great quantity of ore has been extracted from this mine, and is now lying on the dumps and in the ore-house awaiting proper reduction works. The want of capital has retarded progress on this valuable mine, as hoisting machinery and pumps are necessary to prosecute active operations.

THE UNITED BROOKLYN MINING COMPANY

Have located in this district. They have systematically worked their mines, and erected considerable machinery and pumps. As there seems to be an abundance of capital at command, this company will in all probability in time develop a good mine. West of the United Brooklyn company's works are located several mines, known as the Loomis mines. All of them show a remarkably good prospect.

THE CON. ESMERALDA.

The Con. Esmeralda Mining Company has several fine locations. One of these mines has been prospected to a depth of over one hundred feet and excellent results obtained. Ore of free milling quality has been extracted. New horse-power hoisting works have within the past week replaced the old windlass. A building twenty-eight by fifty feet is now in course of erection, and in the Spring a ten-stamp mill will be set up on the bank of the Truckee at some point near town. The next mines in the district are the Saxon, Sweepstake and Hecla, also owned by Renoites, and their prospects are very fair for striking free milling ore. The Mountain View Company have another well-defined ledge. An incline shaft of one hundred feet in depth has been sunk, and ore extracted almost from the surface to its present depth. The Pleasant View Mine adjoins the former, and has equally as good a prospect for a permanent mine. There are a great many other locations in this vicinity with fair prospects, as the croppings in the district extend over several miles in length and assay well. All the foregoing described mines are principally owned by citizens of this town, and by their own energy and means it has been proved beyond a peradventure that Washoe County has abundant mineral wealth to bestow on its prospectors. There is no lack of energy. Capital can be profitably invested in all these mines with as certain a reward as in any mining district in the State. On Granite Hill, in Peavine District, several good mines are being worked, and there are large quantities of copper and silver ore of considerable value.

PYRAMID DISTRICT.

In this district quite a number of promising mines are being worked, and so far free milling ore is predominant. Considerable work has been done and is yet being carried on by the Jones & Kinkead Mining Company. A tunnel of one thousand feet is being run to test the mine at a depth of five hundred feet, and likewise to drain the mine of water. Considerable good ore has been extracted and milled with satisfactory results. Monarch has a tunnel of three hundred and forty-four feet, which cuts through several rich feeders. The whole top of the mine is rich ore, assaying from twenty to seventy dollars, some of which has worked twenty-eight dollars per ton. There are several mines in this district being worked which show remarkably good ledges.

In the southern part of the county we have Galena Hill and White's Canyon. In former times mining was carried on extensively. After several years' abandonment prospectors this year returned and worked on these claims during the past fall with fair results. Ore assaying from thirty dollars to fifty-five dollars per ton was extracted.

Washoe County has a fine mining future before it. When the people well realize the fact that capital can be invested with greater security and more certain reward right here, they will stop gambling in Comstock stocks and adhere more to legitimate mining, for which at the present time Washoe County offers great inducements.

WHITE PINE COUNTY.

For several years there has been a steady decline in the mining prosperity of this county. The vicissitudes of mining have been more keenly felt in White Pine than in any other county in the State. There have been times of depression and times of extraordinary production, occurring with unwonted regularity. Two years ago the indications were that a season of prosperity was about to commence, but the expectations which were then raised have not been realized. Shipments of bullion are still made from Cherry Creek and Ward districts, but the cost of production has been in excess of the yield. Work on the mines of Treasure Hill has been suspended for some time. The total amount of ore extracted during the year 1877, was eight thousand two hundred and fourteen tons, the yield from which was four hundred and eight thousand four hundred and ninety-one dollars and fifty-two cents. The total amount of bullion produced in the county during the seven years ending with 1877, was valued at four million nine hundred and sixty-four thousand eight hundred and eighty-eight dollars and twenty-four cents, or an average per year of seven hundred and nine thousand two hundred and seventy dollars. The average value of the ore was thirty-four and one-half dollars per ton. Considerable attention is given to agriculture and stock-raising, and excellent results are obtained. The arable lands of Steptoe, Spring and White Pine valleys cannot be excelled in any portion of the State, while most of the hills and valleys furnish good grazing for stock. During the year 1878 there were raised five thousand five hundred bushels of wheat, ten thousand two hundred and fifty bushels of oats, forty-one thousand two hundred and twenty-five bushels of barley, twenty-four thousand seven hundred and eighty-five bushels of potatoes, and three thousand nine hundred and seventy-five tons of hay. During the same year the number of cattle in the county was twenty-three thousand four hundred and ninety-four; three thousand five hundred and sixty-two horses, and eighteen thousand three hundred and ninety sheep and lambs. There are here four grist-mills, five saw-mills, fifteen quartz-mills, and six smelting furnaces. The assessed value of real estate is one hundred and seventy-one thousand five hundred and fifty-five dollars, improvements three hundred and eighty-nine thousand eight hundred and forty dollars, personal property six hundred and thirty-seven thousand five hundred and forty-eight dollars, making a total of taxable property one million one hundred and ninety-eight thousand nine hundred and forty-three dollars. The popular vote at the last general election was nine hundred and sixty-three.

WHITE PINE DISTRICT.

The work of exploration for new bodies of ore in the mines of Treasure Hill has been very energetically prosecuted during the past two years, but work has at last been suspended. The supply of ore from the old chambers has been exhausted, the product having long since fallen short of the expense of extraction and the work of exploration. No company in the State has been more persistent in its efforts to develop paying bodies of ore than the Eberhardt and Aurora Mining Companies, whose property is situated in this district. A tunnel was started about two years ago for the purpose of prospecting Treasure Hill at a much greater depth than any of the inclines had yet reached. It had been carried in a distance of about three thousand feet at the time of the suspension of work. The distance from the point where this tunnel was started, to the incline with which it was proposed to connect, is sixty-two hundred feet. The cost of the tunnel so far has been about ninety thousand dollars, an average of about thirty dollars per foot. Unless work be resumed by the Eberhardt and Aurora Companies, the abandonment of the mines on Treasure Hill will be soon complete.

Considerable work is being done on the Jennie A. This mine is situated near the summit of the White Pine range of mountains, about five miles distant from the town of Hamilton. It is located in what is known as the base-metal series of mines, and on a contact vein between quartzite and limestone. A large body of high-grade ore has been found here; but as it cannot be worked by mill process, little bullion will be produced until a smelting furnace has been erected. Arrangements are being made for the erection of such a furnace by Mr. J. R. Kendall, the superintendent of the Jennie A. company.

NEWARK DISTRICT.

This is one of the oldest districts in eastern Nevada, and was organized in 1866. It was then situated in Lander County. It has yielded a large amount of rich ore; but of late the work done here is limited to the necessary assessment work required by the laws of the district to prevent the claims from being relocated. Concerning the property and work done here, the following is from the *Eureka Sentinel*. The property known as the Newark Mill and Mining Company is situated on a spur running from the east side of the Diamond range of mountains, and has achieved more notoriety than any other mine in that locality. Belonging to the company is a twenty-stamp mill, in fair order, with a crushing capacity of twenty-five tons of ore per day. It has been lying idle for the past four years, or thereabouts, but is in good repair and ready for service. The locations owned by the company are the Chihuahua, Lincoln and Buckeye State, all of which, although giving indications of great value, have had little work done on them towards their development, and the greatest depth reached is seventy feet. Even at this depth, and with

this small progress, over one hundred thousand dollars has been extracted from the rich ores gouged out, without giving any heed to the future of the claims; and even then, no profits resulted to the stockholders, for obvious reasons, the most prominent of which was bad management. Instead of working the mines systematically, and with a view to their future permanence, the money was squandered at the mill. Each new agent of the company placed in charge had some pet theory of his own to demonstrate—some wonderful process for reducing the ores; all of which was done at the expense of the stockholders. The last effort in that line was the building of a patent roaster and smelting furnace, at a cost of thirty-five thousand dollars, which was the most glaring mistake of all, the ores being free-milling, and of a similar character to the product of the famous Eberhardt & Aurora, at White Pine, no necessity for roasting existing.

The croppings of the ledge are traceable for a distance of four thousand feet, and as far as explored, preserves the character of a true fissure vein, with well marked hanging walls, etc. Very little judgment has been shown in what work has been done. At the first glance, an old miner sees the extra facilities that exist to explore the vein to a depth sufficient to test its value and permanence. The vein lies in such a shape that by starting a tunnel down the mountain side a short distance, and running it less than five hundred feet, the lode could be tapped at a depth of four hundred and thirty feet. This would be the only profitable and practicable method of opening the ledge and putting the mine on a paying basis. If this step had been adopted years ago, the mine would have had a different history, and a tenth part of the money frittered away in costly experiments would have been sufficient to open the mine in first class shape. Careful estimates have been made of the probable cost of the tunnel, and taking into consideration the character of the formation to be encountered, the expense is set down at seven thousand dollars, and three thousand dollars more would thoroughly prospect the vein. Considering the former output of the mine, and the many flattering indications of the presence of as rich ore bodies as were developed soon after the first discovery, the amount required is trifling, and there is no doubt but that the outlay would open out one of the best mining properties in eastern Nevada. Plenty of wood and water for mill and mining purposes are to be found close by, and there is an inexhaustible salt marsh within three miles of the mill. It is a matter of surprise that so promising a property, and one with such a history, should have been allowed to lie idle so long. That it will not remain in that condition in the future is beyond question. There is a rumor that the company will reorganize and take a fresh start this summer. With a practical and experienced miner at the head of affairs, and a moderate amount of capital to commence with, there is no reason why these locations should not yield as largely in the future as in the past, and the errors that proved such a set-back be retrieved. There are many other mines in the district deserving favorable mention. Joining the Buckeye on the south is the battery mine, owned by R. Sadler. A large amount of ore has been taken out and shipped from this property to Eureka. There are some good mines on the east side of the mountain, but it does not pay, with the present facilities, to ship the ore to Eureka, a distance of eighteen miles or more. This district will yet make a stir in the mining world, and is now one of the most promising sections in this region.

ROBINSON DISTRICT.

During the past summer there has been a revival of mining operations in this district. It is situated forty-five miles east of Hamilton, and fifteen miles north of Ward District, in the same range of mountains. The geological formation of the district in which the mines are found is limestone. The ores very much resemble those found at Eureka. The gangue of the vein is for the most part oxide of iron, which contains the carbonate and sulphuret of lead with gold and silver. There are also quartz ores here which contain gold and silver. Several veins have been found which yield a large per cent. of copper. Many attempts have been made to work the silver and lead ores, both by smelting and milling processes, but these so far have proven failures. The mineral belt is about seven miles in length, and two miles in width.

The district is well supplied with wood and water. Murrey Creek, which contains several hundred inches of water, enters Robinson Cañon near its mouth. Heretofore, little attention has been given to the copper ores which are found here in great abundance, and of high-grade in some of the locations. From the *Eureka Sentinel* of a late date we learn that the experiments which have been recently made to test the smelting qualities of the copper ores have met with great success. The Selby Copper Mining and Smelting Company possess a very fine property, consisting of a number of copper mines within an area of four miles square. The copper exists in the form of carbonates, and the various substances found mixed with it in the different mines are such as to produce a self-fluxing mixture, without the addition of any foreign material. There we have an average assay value of twenty-four per cent. of copper, and they flux so perfectly that not more than one and one-half per cent. of the metal is lost in the slag.

The furnace which was only erected for experimental purposes is a water-jacket, with a capacity of thirty-five tons of ore per day. The hearth of the furnace is an incline dipping toward the slag spout. The furnace is filled to a certain point with ore and coal, and the entire mass, after fusion, is drawn off at the top, the separation of the metal from the slag arising from the difference in the specific gravity of the two substances, the copper settling to the bottom in suitable vessels for its reception. Quite a number of tons of copper have been hauled from their works across to Wells on the Central Pacific Railroad, and shipped to Baltimore, where the best market in America is found for this metal.

OSCEOLA DISTRICT.

The mines in this district were discovered by Mr. James Matteson in August, 1872. The Exchange was the first location made. Since then about one hundred locations have been made on quartz veins. These veins are small, varying from one to three feet in width. The ores carry chiefly gold, and contain from ten to twenty dollars per ton. The veins

run generally north-east by south-west. The Eagle is owned by Matteson & Co., the vein being about four feet in width. It is worked through a shaft and levels from different stations. More work has been done on this vein than on any other in the district. The Crescent is from two to three feet in width. Free gold and gold-bearing sulphurets are found in all the veins in the district, no attention being paid to the saving of the silver. Near the summit of the Snake range of mountains is found the Credit ledge. The vein is eighteen inches in width, and the work is done through a tunnel. During the past summer, a small mill was erected in the district, which has produced a good deal of gold bullion, worth about eighteen dollars per ounce.

Placer mines are also worked in the district. They were discovered in June, 1877, by Mr. John Versan, in two gulches which run nearly parallel with each other. One is called Dry Gulch and the other Wet Gulch, and as indicated by their names, in one is found water and in the other none. Dry Gulch has the greatest sweep from the mountain, and in it are located most of the claims. The richest diggings are found near the point where the two gulches come together. These claims have been located in twenty-acre lots, eighty rods in length by twenty rods in width. About three hundred claims in all have been located in both gulches.

A large nugget which weighed twenty-four pounds was found last summer in one of Mr. Versan's claims, worth about twenty-six hundred dollars. The finder hid it for a month or more, and then carried it to Ward and had it melted in small bars. The thief repented of his crime and returned the bullion to the owner.

The great drawback in working these placer claims is the scarcity of water. About one inch of water has been obtained by running a tunnel into Wet Gulch, and this is the only supply which has yet been made available. This is used chiefly in rockers. Whenever sufficient water can be brought here for operating sluices, the product of gold will be greatly increased, for many of the claims which are idle now can then be profitably worked.

CHERRY CREEK DISTRICT

There has been little change in the prospects of this district since my last report. Work continues to be prosecuted with energy, chiefly upon the Star mine. During the past year, the ten-stamp mill belonging to the Star Company has been kept constantly running and making regular shipments of bullion. Mr. Al. Ray, a gentleman who has had great experience in examining the mines in this vicinity, has prepared the following description of the district:

The Star mine is situated ten thousand five hundred feet north-east of the northern terminus of the Pacific mine. The Company's working shaft is located on the east rim of the same mineral belt on which the Pacific is situated. This belt is of a uniform width of from three hundred to four hundred feet. Its general strike is to the south-west and north-east, with a dip to the eastward. Between the Star and the Pacific the following are the intervening claims located directly on the lode that follows the belt between the two mines:

Beginning at the Pacific, they are the Mary Ann, Flagstaff, Tenbrook, Last Chance, Ida, America and Satellite, the last-named mine joining the Star on the south-west. The Star hoisting works are situated about three hundred and eighty feet east of the belt, and on an east and west cross vein that branches out at right angles from the mineral belt, caused, probably, by the heavy dykes of granular quartz that are observable on the Star hill; but as depth is attained, there is no question but what it will identify itself with the ore channel that follows the belt in its north-easterly and south-westerly trend. When that is accomplished, judging from present prospects and surface surroundings, the mine will be second to none in the eastern part of the State. There is a distance of ten thousand five hundred feet of silver bearing lode between the two above named points, to say nothing of the continuation north-east of the Star and south-west of the Pacific, that in any other place but White Pine county would be worked to their fullest extent, but the supposition exists on the outside that whenever mineral deposits are situated within this county they must bear the White Pine coat of arms—limestone. In fact the limestone and shale lie three-fourths of a mile west, running parallel, and do not intersect the belt at any point; of this I will speak hereafter. The continuation of the lode is located and worked for a distance of six thousand feet north-east of the Star mine, and likewise on a continuation of the lode south-west of the Pacific, five thousand six hundred feet, that foot up a total length of twenty-two thousand one hundred feet, with ore cropping out the entire distance, and sometimes to a width of from fifty to ninety feet, with its innumerable stringers and spurs running out at right angles east and west. Some of the ore in the stringers and spurs will assay up in the thousands, in silver. The Flagstaff, the second claim on the north from the Pacific, is noted for its rich stringers, spurs, ore vugs, mineral caves and ore scattered around through the rock in place, sufficiently diffused to justify giving it the name of a mineralized quartzite belt of metal-bearing rock. In fact the early workings of the Flagstaff Company were all on the surface cross-fissures, spurs and caves.

Up to the time when Joe Potts, of Richmond fame, banded the Pacific, and started a tunnel at the base of Flagstaff Hill, and discovered that the lode carried pay ore in large quantities as depth was attained, and was sued by the Mary Ann, the theory of Mr. Potts was, that the croppings being so extensive, he would certainly develop rich deposits as depth was attained, which proved correct. The tunnel is run along on its west underlying rock for a distance of about five hundred feet, following the lode in its north-easterly strike. Up to the time they discontinued work in the Pacific mine, on account of litigation, they claimed that they had a defined hanging wall the entire length of the tunnel. But subsequently the Mary Ann Co. drifted east on the supposed hanging wall, and discovered that it consisted of pay ore, and as yet no hanging wall has been found. The ore throughout all the excavations has no particular stratification, showing conclusively that there is a large ore channel following this mineral belt. The query is, if the Pacific and Mary Ann develop such a mine as depth is attained, what should the Flagstaff develop when the tunnel is extended under its mammoth croppings, its width of eighty feet of mineral, besides its continuous run of stringers, fissures, etc., for the entire width of the quartzite belt defined within its limits. Taking this lode for a distance of twenty-two thousand feet, it is similar in all respects to Flagstaff Hill; and, if anything, the lode improves in richness upon its continuation north-east from the Flagstaff. The boundary rock on the west side of this belt is slate the entire length,

and on the east side of the belt, from the Mary Ann, going south-west, granite; and from the same place going north-east, a slate belt of about four hundred feet in thickness. This belt of mineralized quartzite, found between slate and granite walls, has at some period been subjected to some force of nature, by which it has been broken up and crushed, disintegrated and fissured in all directions, so as to destroy, except at intervals, all traces of stratification, thereby fitting it for the reception of the mineral that has come up from the depths below in solution, and deposited in it. This formation differs from the boundary rock that follows the belt, the stratification of which has never been disturbed, except at the Star Hill, where a cross-fissure penetrates the east wall of the belt. I have particularized those two points, the Pacific and the Star mines, on account of their more extensive developments; but there are claims on the same belt that are superior to either of them, on their surface prospects, for quality and quantity. For want of mills that would reduce ores at reasonable rates, and the capital the country so badly needs, these mines must go undeveloped; and there are poor inducements for the prospectors to do much more than their annual assessments to keep their mining titles good, and which they propose to continue doing; for it will be observed that this speck on our planet's disc is no exception to other mining districts. It has its accomplished croakers, with no limit to their profound wisdom.

The above described mining ground is known as the east lode or mineral belt. Leaving this and traveling west over slate and quartzite for about three-fourths of a mile, the limestone is met with. This limestone belt is continuous, and has a uniform width of about five hundred feet; it runs parallel to the lower belt. On the east rim of this belt is where the Bonanza, Alta, Geneva, Exchequer and Victory mines are situated. The croppings of these mines are rich in gold and silver, besides carrying a large percentage of lead. On the west rim of the limestone belt, between the lime and the shale, is where the black metal ledge is situated. The claims most prominent on this ledge are the Pine Nut, Ticup, Chance, Baltic and Wonderer mines. This ledge, like its companion on the east, has a dip to the westward. The stratification on the east and west rim of this limestone belt is undisturbed; they constitute continuous, separate and contact veins. One is called the middle ledge, the other the west or black mineral ledge. It will be perceived by this statement that there is a lower mineral belt or east lode, and a middle and west ledge, all running parallel, north-easterly and south-westerly; that the east lode has no connection whatever with limestone.

WARD DISTRICT.

This is still the most important district in White Pine County, and Ward the most populous town. It is situated on the eastern slope of the Robinson range of mountains, about one hundred and ten miles from Eureka and one hundred and seventy-five miles from Wells, on the Central Pacific Railroad. The geological formations are quartzite, limestone and granite. The facilities for mining and milling in this district are not surpassed in eastern Nevada. Wood and water are found here in abundance

for all purposes. Willow Creek, a short distance from the mines, affords an inexhaustible supply of water, while the precipitous mountain in which the mines are located is very favorable for their exploration by means of tunnels through which they are at present worked. The ores of this district, although of high grade, are very difficult of treatment. From this cause chiefly, and partly owing to the bad management of those in charge of the reduction works, the results obtained here have not been as favorable as the prospects and developments of the mines would appear to warrant.

MARTIN WHITE COMPANY.

Some of the most valuable mines in Ward District belong to this Company, viz: Paymaster, fifteen hundred feet; Defiance, fifteen hundred feet; Mountain Pride, fifteen hundred feet; Young America, fifteen hundred feet; Caroline, fifteen hundred feet; Mammoth, fifteen hundred feet; Ben Lomond, fifteen hundred feet; Ben Voirlick, fifteen hundred feet; Land Grampus, fifteen hundred feet; Home Ticket, fifteen hundred feet; Wisconsin, fifteen hundred feet; Ben Nevis, fifteen hundred feet; Maggie, fifteen hundred feet; Cyclops, fifteen hundred feet; Nestor, fifteen hundred feet; Ward and Henry, two hundred feet; Alameda, two hundred feet. The Paymaster mine has been opened up in a very systematic manner by means of tunnels, of which there are three, twelve hundred, thirteen hundred and seventeen hundred feet in length. The most extensive developments in the district have been made in this mine, and from it has been produced about all the bullion shipped from Ward. The yield so far has been about five hundred and fifty thousand dollars. No dividends have been declared, but instead assessments to the amount of five hundred thousand dollars have been collected. During the past summer another mill has been erected. It has twenty stamps, and commenced operations about the middle of November. This mill is very complete in its arrangements, and has in connection with it three of the improved White and Howell furnaces. This plan of roasting before amalgamation, it is thought, will obviate the difficulty heretofore experienced in working the ores from the Paymaster mine. The process of lixiviation introduced here by this company has been abandoned. The principal portion of the ores have heretofore been smelted, and two water-jacket furnaces were erected. A wire-cable tramway has been constructed from the lower tunnels to the ore-house at the new mill, which will greatly facilitate the transportation of ore from the mine. It is nine hundred feet in length. The latest information from Ward is, that the new mill is working splendidly. The ore is now being chlorinated by roasting with salt, which converts from ninety-three to ninety-seven per cent. of the silver to a chloride, and of this amount, eighty-three per cent. is saved by amalgamation. The ore averages about seventy dollars per ton.

During the past two years the Martin White Company has been engaged in expensive litigation to determine the right of possession to a portion of its ground. The decision of the Supreme Court of this State in the case of Katie Gleeson v. The Martin White Company is of so much importance in settling certain questions which have arisen under the United States law regulating the location of mines, that it is here given in full.

OPINION BY JUDGE BEATTY.

This is an action to determine the right of possession of certain mining ground in the Ward District, White Pine County. The plaintiff derails title from the location of a claim called the Shark, and the defendant is the grantee of the location of the Paymaster. Both claims were located on the same ledge—the Paymaster in July, the Shark in September—and the principal question in the case is as to the validity of the Paymaster location.

The facts in regard to this location are very clearly and fully presented by the findings of the District Judge, which embrace the special verdict of a jury upon a number of issues submitted to its decision. No exception whatever is taken by either party to the findings of the jury, and the objections of the appellant to the additional findings of the Court relate rather to the conclusions of law involved than to the facts on which they are based.

The question before us is therefore narrowed down to a construction of the legislation of Congress and the local rules of the Ward District governing the location of mining claims.

Before entering upon a discussion of the purely legal questions involved in the case, however, it will be best to give a connected statement of the facts, which are as follows:

Mineral deposits were first discovered in what is now the Ward Mining District by Thomas F. Ward, in March, 1872. On the first of May the district was organized, a set of local rules adopted, and (it seems) Ward appointed Recorder. The rules so first adopted were, in their general features, like the rules everywhere prevalent on this coast before the enactment of the Law of Congress of May 10, 1872. Claims were to be located by posting a notice at the point of discovery; the notice to be recorded in fifteen days; this to hold the claim good for one hundred days, within which time a certain amount of work was to be done on the ground in order to hold the claim a year. Each locator was to have fifty feet of the surface on each side of his ledge or vein, but this not to carry the right to any mineral deposit therein distinct from the one located. These rules, so far as they were not inconsistent with the Act of Congress of May 10, 1872, continued in force until the first of October, following, when the miners adopted a new set of rules.

Such being the law of the district for the location and holding of claims, Ward, on the seventeenth of July, 1872, discovered the vein or ledge which is now in controversy, and placed upon the croppings at the discovery point the following notice:

“Paymaster location notice.—We, the undersigned, do hereby locate and claim fifteen hundred (1500) feet on this ledge, lode, or deposit of mineral-bearing quartz or rock, with all its dips, spurs, angles and variations, together with all privileges prescribed by the mining laws of the United States and this district, and intend to hold and work the same according. We claim three hundred (300) feet easterly, and twelve hundred (1200) feet westerly from this monument, running along the course of the vein. This shall be known as the Paymaster.

“Ward Mining District, July 17, 1872, situated about fifteen hundred feet north-west by north, from Mountain Pride lode.”

To this notice were appended the names of the locators, and opposite the name of each were set the number of feet (undivided) to which he was to be entitled.

On the following day, July 18, the claim was recorded by Ward, as Mining Recorder of the district, by copying into a small memorandum book, which he carried in his pocket, and which at that time constituted the record book of the district. Subsequently, about the first of August, a larger book was obtained, and the records transcribed from the little book. In the meantime, however, the Paymaster notice, and the record of it, had been changed as follows: It seems that there was some sort of an agreement subsisting between Ward, John Henry, E. C. Hardy, and three others, that they should be equally interested in the locations made by Ward. But in the location of the Paymaster, Ward had omitted Hardy's name, and inserted that of Dave Pearson, who was not a member of the company. A few days after the location and recording of the claim, Henry called Ward's attention to the fact that Pearson's name was improperly on the notice, and Hardy's name improperly omitted. He also objected to the unequal distribution of the claim among the six locators. Ward thereupon changed the notice on the ground, and the record in the little book, by erasing the name of Pearson, and substituting the name of Hardy, and by changing the figures following the names, so as to give to each locator two hundred and fifty feet of the claim. These changes in the notice and in the little book were made before the transcription to the large book, which, since the first of August, 1872, has contained the records of the Ward District.

Subsequent developments have shown that the vein or ledge upon which this Paymaster claim was located has a course or strike from south-east to north-west. According to the magnetic meridian (variation $16\frac{1}{2}^{\circ}$) it runs more nearly east and west.

In September, 1872, some work—it does not appear how much—had been done on the Paymaster location, but the course of the vein was not clearly determined.

Such being the condition of that claim, on the ninth of September the locators of the Shark discovered the croppings of the same vein at a point about four hundred feet north-west of the location point of the Paymaster, and posted the following notice:

"Shark mine No. 1. Notice: We, the undersigned, do hereby locate and claim fifteen hundred (1,500) feet on this ledge, lode or deposit of mineral-bearing quartz and rock, with all its dips, spurs, angles and variations, together with all privileges prescribed by the mining laws of the United States and this district, and intend to hold and work the same according. We claim seven hundred and fifty feet on each side of the monument running along the course of the vein. This shall be known as the Shark mine No. 1.

"Ward Mining District, Nye County, Nevada, September 9, 1872.

"JOHN TAYLOR, 375 feet.

"THOMAS CONNOR, 375 feet.

"MATHEW GLEESON, 375 feet.

"CHAS. STRUTENBERGER, 375 feet."

On the following day this notice was recorded, the certificate to the record being as follows:

"Recorded September 10, 1872, at 10 o'clock A. M. Situated about 600 feet north-easterly from Young American mine, and about 300 feet north-westerly from Paymaster mine.

"THOS. F. WARD, Recorder."

Some significance is attributed to the fact that Ward, the locator of the Paymaster, going upon the ground for the purpose of making this record, and necessarily observing the proximity of the Shark to the Paymaster, made no complaint at the time that the Shark locators were on his claim. It was not until October, and after some work had been done by the locators of the Shark, that notice was given that they were on the Paymaster vein. They, however, denied that it was the same vein. They claimed a cross vein, and declared that if it turned out that they were on the Paymaster they would give it up.

About this time—on October 10, 1872—John Henry, one of the Paymaster locators, took down their notice and put up another, the same in all respects as the one removed except that it claimed three hundred feet southerly and one thousand two hundred feet northerly from the monument, instead of three hundred feet easterly and one thousand two hundred feet westerly. On the same day he drove down two stakes, one at the north-west end of the Paymaster and the other at the south-east end. They were marked "North-westerly stake of Paymaster" and "South-easterly stake of Paymaster." These stakes were on a line, or very nearly on a line, with the croppings of the vein as now developed, and within a few feet of the center line of the claim as now surveyed. At some time subsequent to the change of the notice on the mine, a corresponding change was made in the record of the claim by erasing the words easterly and westerly, and inserting the words southerly and northerly. The jury could not find who made this change in the record, but the District Judge was of the opinion, and so are we, that it was done by Ward and Henry, but without any fraudulent intent.

In the meantime, on the first of October, the laws of the district had been changed so as to conform more nearly to the Act of Congress of May 10, 1872, it being especially provided that locators should have three hundred feet of surface ground on each side of their vein—to include, of course, not only the vein originally located but all veins within the surface lines. (R. S., Sec. 2322.)

It is found as a fact that sufficient work has been done under each of these locations to satisfy the requirements of the law of Congress and the rules of the district. The Paymaster location was never marked upon the ground in any other way than by the three stakes on the line of the croppings—one at each end and one at the point of discovery—until it was surveyed for the purpose of the patent application in October, 1875. The Shark location was never marked on the ground in any way, except by the monument at its initial point, until April, 1874, when Gleeson set stakes at the four corners of the surface claim. On these facts the District Judge concluded that the Paymaster location was valid, and, as a consequence, that the subsequent location of the Shark on the same ground was invalid. In accordance with this conclusion, the judgment of the District Court was for the defendant.

The plaintiff, appealing from the judgment and from the order denying her motion for a new trial, makes a number of assignments of error, which, however, are all involved in the three propositions following: It is contended:

1. That the Paymaster claim was not located in conformity with the Act of Congress and the rules of the district, and consequently that it was void;
2. That the Paymaster locators, if they ever had a good claim, abandoned it; and,

3. That they are estopped by their own acts from asserting any claim adverse to the Shark.

Keeping these propositions entirely distinct, and confining our attention for the present to the first, it is to be observed that there is no question that the locators of the Paymaster were the original discoverers of the ledge in controversy; that they made a *bona fide* attempt to locate it; that their claim was notorious; that they and their successors have continued to occupy and develop the property; that the Shark locators were aware of the priority of the Paymaster claim, and originally repudiated any intention of locating upon the same vein. These facts being conceded, the only position open to the appellant, and the only position her counsel have attempted to maintain, is, that a mining claim cannot be held except by compliance with certain requirements of the mining laws; that the Paymaster locators did not conform to those requirements, while the locators of the Shark did, and that, as a necessary consequence, the law gives her the property. Aside from the questions of abandonment and estoppel, she claims nothing except from a strict application of the law, regardless of any seeming hardship in depriving the defendant of a mine which its predecessors were the first to discover, claim and develop.

There can be no doubt as to the correctness of the position upon which this claim is founded.

The United States have granted to their citizens, and to those who have declared their intention to become such, the right to explore and occupy the public mineral lands. (U. S. Revised Statutes, sec. 2319.) Those qualified locators who comply with the laws of the United States, and the local regulations not in conflict therewith, governing their possessory title, have the exclusive right of possession and enjoyment of their locations: (R. S. 2322.) He who complies with the law has the exclusive right. Therefore, if it is true that the Shark locators complied, and those of the Paymaster did not, the plaintiff must take the mine, no matter who is entitled to the credit of the discovery.

What, then, constitutes compliance? The questions involved in this branch of the case have led to a very thorough and elaborate discussion of the mining laws of the United States, and particularly of the Act of Congress of May 10, 1872 (R. S., Sec. 2319 *et seq.*), under which these claims were located, and which embodies the most important features of the mining legislation. The same questions were, to some extent, involved in the case of the Golden Fleece Company v. The Cable Consolidated Company (12 Nev. 312), but were not very fully argued, and were discussed in the opinion only so far as seemed to be necessary for the disposition of that case. Some of the conclusions then announced have been questioned by counsel for respondent in this, but after a thorough re-examination of the whole subject, with all the light that has been thrown upon it by the most elaborate argument, oral and written, we remain entirely satisfied with that opinion. So far as it goes, it is a correct exposition of our present understanding of the law. But it does not cover the whole ground, and is perhaps not sufficiently explicit upon some of the points adverted to. The magnitude of this case, and the great importance of the subject to a mining community warrant a re-statement of our views in a more complete, and we hope, a more convincing form.

One of the imperative requirements of the statute, an indispensable condition precedent of a valid location, is that it shall be "distinctly marked on the ground, so that its boundaries can be readily traced (R. S., Sec. 2324)." By reference to the foregoing statement of facts, it will be

seen that one of the locators of the Shark, in April, 1874, marked the boundaries of that location by setting stakes at the four corners of the claim. It is conceded that this was a sufficient marking of that location; but it is contended that the Paymaster had been sufficiently marked since October 10, 1872, by means of the two stakes at the ends of the claim on the line of the croppings and by the location monument at the point of discovery. Whether this marking was sufficient to answer the requirements of the statute is the principal question in the case, and as a step towards its solution, counsel have devoted a great portion of their argument to the preliminary question. What does a mining claim consist of; what are its essentials, what are its incidents? Is it the surface ground that is located, or is it the vein with the surface as an incident? It is conceived that a determination of this point will greatly facilitate the inquiry as to what sort of marking of boundaries is required. Counsel for appellant contend that the location is of the surface, and that stakes at the corners of the claim are essential. Counsel for respondent insist that the location is of the vein as the principal thing, with the surface as a mere incident, and that stakes to define the limits of the claim upon the vein are sufficient.

What we said in the Golden Fleece case we think expresses the truth in regard to this matter: "It is true that the vein is the principal thing, and that the surface is but an incident thereto; but it is also true that the mining law has provided no means of locating a vein except by defining a surface claim, including the croppings or point at which the vein is exposed, and the part of the vein located is determined by reference to the lines of the surface claim." (12 Nev. 329.)

The vein is the principal thing in the sense that it is for the sake of the vein that the location is made; the surface is of no value without it; no location can be made until a vein has been discovered within its limits, and the surface must or at least ought to be located in conformity with the course of the vein. (R. S. 2320.) But the location is of a piece of land including the vein.

"A mining claim located after the 10th day of May, 1872, whether located by one or more persons, may equal, but shall not exceed, fifteen hundred feet in length along the vein or lode; but no location of a mining claim shall be made until the discovery of the vein or lode within the limits of the claim located. No claim shall extend more than three hundred feet on each side of the middle of the vein at the surface, nor shall any claim be limited by any mining regulation to less than twenty-five feet on each side of the middle of the vein at the surface, except where adverse rights existing on the 10th day of May, 1872, renders such limitation necessary. The end lines of each claim shall be parallel to each other." (R. S. 2320.) This section alone shows that it is a surface parallelogram not less than fifty feet in width that must be located. But the purpose of the law is more clearly indicated by its granting clauses. What is it that the locators have the exclusive right to possess? Having complied with the laws they shall have the exclusive right of possession and enjoyment of all the surface included within the lines of their locations, and of all veins, lodes and ledges throughout their entire depth, the top or apex of which lies inside of such surface-lines extended downward vertically, although such veins, lodes or ledges may so far depart from a perpendicular in their course downward as to extend outside the vertical side-lines of such surface locations. (R. S. 2322.) This is the only part of the Act which grants the right to possess any lode, ledge or vein.

The vein originally discovered, and for the sake of which the location is made, is lumped in with other mineral deposits that may happen to exist within the limits of the surface claim, and no part of it is granted except that part the top or apex of which lies inside of the surface lines extended downward vertically. This, it would seem, ought to be conclusive, but the language of section two thousand three hundred and twenty-five is, if possible, still more convincing: "Section 2325. A patent for any land claimed and located for valuable deposits, may be obtained in the following manner: Any person, association, or corporation authorized to locate a claim under this chapter, having claimed and located a piece of land for such purposes," may, by taking the prescribed steps, obtain the title upon payment of five dollars per acre for the land.

Thus it appears that a location on a vein must be made by taking up "a piece of land" to include it. No other means are provided, and it is only upon condition of complying with the law that the locator becomes entitled to anything. The discoverer of a vein may be allowed a reasonable time to trace its course, before being compelled to define his surface claim, and in the meantime may be protected in his claim to one thousand five hundred feet of the vein, but his location will never be complete until his surface claim is defined.

That this is the only possible construction of the statute, seems so plain to our minds that we should have thought it superfluous to say a word in defense of our view if we were not aware that an opposite opinion is very largely prevalent.

We think this is due to the fact that the custom of locating a vein claim by means of a notice posted on the croppings, and of holding it by record of the notice and work done at the discovery point, without any definition of boundaries, has prevailed so long and so universally on the Pacific Coast that the system has come to be regarded by a great many as something essentially inherent in the nature of things. The right, under such locations, to follow the vein in whatever direction it might run, to the extent claimed in the location notice, taking the adjacent surface necessary for the convenient working of the mine as a mere incident thereto, has been so long recognized and enjoyed as to have almost assumed the character of one of the natural and inalienable rights of man. That the Government, in disposing of its mineral lands, has adopted a radically different system, under which a vein can only be located by means of a surface claim, and held only to the extent that it is included within the surface lines, is a thing too incredible to be believed by those to whom the old customs seemed rooted in the very foundations of justice.

But disagreeable as the awakening may be, it is time we were opening our eyes to the fact that a new system has been introduced. The Act of Congress of May 10, 1872, has effected the changes above indicated. Its language is plain, unambiguous; and whatever may be our opinion of the impolicy of the changes effected by it, we are bound to submit and conform ourselves to its requirements. If the terms of the statute left any room for construction, the *argumentum ab inconvenienti* might be entitled to great weight, but it cannot be invoked where the language of the law is so plain as it is in this instance.

Besides, we do not share in the opinion that the new system is so utterly bad. Nobody can pretend that it is a great improvement on the system which it displaced. We are willing to admit that cases may arise to which it will be difficult to apply the law, but this only proves that such cases escaped the foresight of Congress, or that, although they fore-

saw the possibility of such cases occurring, they considered that possibility so remote as not to afford a reason for departing from the simplicity of the plan they chose to adopt. So far, the wisdom of the Congressional plan has been sufficiently vindicated by experience. It is true that veins and ledges are not found to be perfectly regular in their formation—they have not a perfectly straight course even in depth—and near the surface they present still greater irregularities of strike and dip; but still they approximate the ideal vein that Congress seems to have had in view sufficiently nearly to admit an easy application of the law in all the cases of conflicting claims that have fallen under our observation.

As to the difficulty of establishing surface lines immediately upon the discovery of a vein, that also is conceded. It is a well known fact that the croppings of a vein are always very imperfect and often a very deceptive guide to its course; and it will often be difficult and sometimes impossible to locate a surface claim in conformity with the course of the vein, even after years spent in its development.

But all this affords no argument against the system. Unless the miners voluntarily restrict themselves by local regulations, a claim may always be fifteen hundred feet long by six hundred feet wide. Let the discoverer of a vein be ever so unfortunate in locating his claim, he cannot possibly get less than six hundred feet of the vein, while under the old law the most he could get was four hundred feet. How then can it be said that he is subjected to any hardships? So far from restricting his rights, the new law has very greatly enlarged them, and at the same time has made them vastly more certain and secure.

Furthermore, we do not understand that the law requires the surface claim to be defined immediately upon the discovery of the vein. We think that under any circumstances the discoverer, if he went to work diligently to trace out its course, would be allowed a reasonable time for that purpose, and in the meantime would be protected in his right to one thousand five hundred feet of the vein. In the absence of any State or Territorial or local regulation prescribing the time to be allowed for tracing, the question as to what should be deemed a reasonable time would have to be determined in view of the facts and circumstances of each case. We said, however, in the *Golden Fleece* case (12 Nev. 329), and we still think that this is a matter for local regulation under the power delegated to the miners by section 2,324 of the Revised Statutes, to make rules not in conflict with the laws. Any reasonable rule for the provisional holding of a claim, by means of the posting and recording of notice, during the time necessary for tracing would, we feel confident, be favorably viewed by the courts, especially if it required the locator to use diligence in the work of tracing during the time allowed for that purpose. This, however, is a question which we are not called upon to decide in this case. We have been led into this line of argument in response to what has been said by counsel for respondent in regard to the great hardship imposed upon the discoverer of a vein by compelling him to define his surface claim before he could possibly ascertain the course of the vein. If we are right in our opinion that he would be allowed a reasonable time for tracing, the supposed hardship does not exist. If we are wrong, and if the discoverer must set his stakes without stopping to trace the vein, even then, as we have shown, he is better off since than he was before the statute. His surface lines will necessarily include at least six hundred feet of the vein, and may include upwards of one thousand six hundred. In the latter case he may be compelled to readjust his lines so as to take only one thousand five hundred feet,

but in any case he can secure six hundred feet. Before the statute he could claim no more than four hundred feet of the vein, and of that he was not secure for a day. The moment he developed rich ore he was beset by trespassers, and in order to enjoin them from stealing his property, was obliged to trace the vein between them and the location point. He was harassed with litigation, and his means often entirely consumed in the prosecution of work not necessary for the development of his mine, but essential for the vindication of his title. Under the new law this source of vexation and expense is entirely swept away. Within his surface lines the discoverer of a vein is secure, and he might well consent to sacrifice something in the extent of his claim for the sake of that security.

So far, however, from having to make such a sacrifice, his claim, at the very worst, is more ample than it ever was before. Sound policy, therefore, concurs with the language of the statute in sustaining our conclusion that a vein can only be located by means of a surface claim. How soon after the discovery of the vein "the location must be distinctly marked on the ground so that its boundaries can be readily traced" (R. S. 2324), we do not decide; but until it is so marked we are clear that the location is not complete, and the law has not been complied with.

So far we agree entirely with the views of counsel for appellant; but, although we are satisfied that a location must be of a surface claim, and that the boundaries and extent of the claim must be plainly defined by stakes or marks on the ground, it does not appear to be a necessary consequence that the least admissible marking is by posts or monuments at all the corners of the claim.

We are aware that the Commissioner of the Land-office has recommended the planting of posts at the corners, and the erection of a sign-board with the name of the claim, the names of the locators, etc., at the location point; and undoubtedly a compliance with these recommendations would be sufficient to satisfy the law in this particular. But at the same time we think it may be satisfied by something less. There is, after all, something in the fact that it is a mining claim, and not an agricultural claim that is being located; and some account should be taken of the customs, habits and circumstances of a mining community in determining what is a sufficient marking of a mining claim. The vein is always the principal object that the locator has in view; it is generally, after location and work at the location point, a conspicuous feature of the locality; it is the first thing that attracts the attention of mining men; the surface claim by which it is to be located ought to conform to its course; the end lines must be parallel; and, as they ought to conform to the dip of the ledge as nearly as practicable, they ought to be at right angles to the side lines, so that if the center-line of the claim is once established, the boundaries are thereby fixed, and may be readily traced.

The object of the law in requiring the location to be marked on the ground is to fix the claim—to prevent floating or swinging—so that those who in good faith are looking for unoccupied ground in the vicinity of previous locations may be enabled to ascertain exactly what has been appropriated in order to make their locations upon the residue. We concede that the provisions of the law designed for the attainment of this object are most important and beneficent, and that they ought not to be frittered away by construction. But it must be remembered that the law does not in express terms require the boundaries to be marked. It requires the location to be so marked that its boundaries can be readily traced. Stakes at the corners do not mark the boundaries; they are only

a means by which the boundaries may be traced. Why not, then, allow the same efficacy to the marking of a center line in a district where the extent of a claim on each side of the center line is established by the local rules? It would be safer and therefore better to comply with the recommendations of the Land-office and erect stakes at the corners of the claim, but if the grand object of the law is attained by the marking of a center line we can see no reason why it should not be allowed to be sufficient.

In this case the locators of the Paymaster marked the center line of their claim on the tenth of October, 1872. No miner, no man of common intelligence, acquainted with the customs of the country, could have gone on the ground and seen the monument, notice and work at the discovery point and the two stakes—one three hundred feet south-east of the location monument, marked "South-easterly stake of Paymaster," the other twelve hundred feet north-west of the location monument and marked "North-westerly stake of Paymaster"—in a line with the croppings and the discovery point, without seeing at a glance that they marked the center line of the claim. By the rules of the district and the laws of the land he would have been informed that the boundaries of the claim were formed by lines parallel to the center line and three hundred feet distant therefrom and by end lines at right angles thereto. With this knowledge he could have traced the boundaries and, if such was his wish, ascertained exactly where he could locate with safety. We conclude, therefore, that the Paymaster location was sufficiently marked on October 10, 1872. At that time the Shark location had not been marked in any way, and whether the law allows a locator a reasonable time or not to mark his boundaries—protecting his full claim in the meanwhile—the same result equally follows. If the Paymaster was not marked within a reasonable time after discovery, then certainly the Shark was not, for the first was marked within three months and the latter not until more than eighteen months after discovery; so that the Shark claim was lost by the failure to mark its location within a reasonable time, and such time is allowed, then the Shark was thereby excluded. If no time for tracing is allowed, and the first to mark his boundaries is first in right, then the Paymaster location holds the claim, because it was first defined by monuments on the ground.

Unless the Paymaster location failed in some other particular to comply with the law, there is no hypothesis upon which anything can be claimed under the Shark location.

But it is contended that the Paymaster location was rendered invalid by non-compliance with the rules of the district and the law of Congress respecting the notice and record of claims.

There is no doubt that in order to secure the right of possession to a mining claim there must be a compliance not only with the laws of the United States, but also with such local regulations of the mining district as are not in conflict therewith (R. S. 2324), and if the miners of the Ward District have made the posting and recording of location notices essential, the courts are not at liberty to dispense with them.

The original laws of the district were adopted May 1, 1872, ten days prior to the passage of the Act of Congress, which, as we have seen, introduced an entirely new system of making locations—a system in which the preliminary posting and recording of notices is entirely out of place, except as a means of protecting a claim during the time necessary for tracing the ledge and marking the boundaries of the location. When the location is thus marked, all that the notice and record were intended

or expected to accomplish is effected in a manner far more satisfactory and complete. In place of a very imperfect, and often misleading, notice of what was claimed, there is a plain and unambiguous notice to all the world of the exact position and extent of the location. It might well have been held, therefore, with respect to the rules adopted May 1, 1872, that their requirements as to the posting and recording of notices were superseded by the Act of Congress of May 10, 1872; that they were merged in the higher and more efficacious rule of the statute, or, at least, that if they continued of any force whatever, it was only as a means of protecting a vein discovery during the time reasonably necessary for tracing its course and marking the boundaries of the location, and consequently that if the discoverer chose to mark his location in the beginning, or actually did so at any time before an adverse claim was made, his failure to post and record a notice would count for nothing.

But the rules of the district were revised on the first of October, after the passage of the Act of Congress, and the provisions with respect to the notice and record of claims were readopted without any additional provision for bringing them into sensible relation to the law. They do not purport to supply a means of holding a claim pending the marking of the location on the ground, but stand as substantive and independent requirements, a compliance with which is essential to the validity of a claim. We are not willing, under the circumstances, to go to the extent of holding that their observance can be dispensed with, even where a location has been plainly marked before the making of an adverse claim. We will assume that it was necessary for the locators of the Paymaster not only to have marked their location before the Shark locators complied with the law, but also to have posted and recorded a notice of the claim. Did they do so?

There can be no question that the original Paymaster notice was all that the law requires. The only objection to it is that it did not contain in itself a description of the claim by reference to some natural object or permanent monument. It was not necessary that it should. It is only the record of the claim that is required to contain such a description; and there are excellent reasons for making a distinction between the notice and record in this particular. A notice is generally, and for safety ought always to be, posted immediately upon the discovery of the vein, before there is any time to survey the ground, and ascertain the bearings and distances of natural objects or permanent monuments in the neighborhood; and besides, the claim referred to by the notice is always sufficiently identified by the fact that it is posted on or in immediate proximity to the croppings. A notice claiming a location on "this vein" has only one meaning. But the notice is exposed to the danger of removal by adverse claimants, or destruction by the elements, and for permanent evidence of the location its record is provided for. The record, if it consisted of a mere copy of the notice, would not identify the claim, and there would be an opportunity as well as a temptation to the locators, upon the discovery of a more valuable mine in the vicinity, to prove, by perjured witnesses that their notice was posted on that mine. The floating of claims was by no means an infrequent occurrence prior to the Act of 1872, and if such attempts were seldom completely successful, they were always vexatious, and often the means of levying a heavy blackmail. It was on this account that the record (not the notice), was required to contain "such a description of the claim or claims located by reference to some natural object or permanent monument as will identify the claim." (R. S., Sec. 2324). It is a sufficient compliance with this provision of the

law if the description of the *locus* of the claim is appended to the notice when it is recorded. But by reference to the foregoing statement of facts it will be seen that not only did the record of the Paymaster location contain the necessary description, it was also contained in the body of the notice as posted on the ground: "Situated about fifteen hundred feet north-west by north of the 'Mountain Pride lode,'" is the description in the notice; and as no objection to it was made upon the ground that the "Mountain Pride lode" was not a well known natural object, at that distance, and in that direction from the Paymaster location monument, we presume it was, in fact, a good description. The record also contained the names of the locators and the date of the location, and thus fulfilled every requirement of the Act of Congress. (R. S., Sec. 2324.) But it was changed by Ward and Henry, and it is contended that after those changes it was no longer a good record.

The argument in support of this point is about as follows: Pearson, whose name was in the original notice, as first recorded in the little book, was one of the locators of the claim; he had a vested right, and could not be deprived of his interest by the erasure of his name from the notice and record, and consequently after his name was scratched out the record no longer contained the names of the locators, and was void. We do not think it is by any means clear that Pearson ever acquired any interest in the claim. It does not appear that he ever assented to the use of his name as a locator by Ward, who actually made the discovery and posted and recorded the notice, and it does appear that there was some sort of arrangement by which Ward was to divide his discoveries equally among those whose names were afterwards signed to the notice. If Pearson had no right to a share in the discovery, and if Ward merely inserted his name by mistake or under some misapprehension, and erased it before the claim had been perfected by work or the marking of its boundaries, it is difficult to see upon what ground he could claim to have ever had any vested right as a locator. But whether he had or not is a question between him and the other locators of the Paymaster. As to outsiders, the notice and record were sufficient. They contained the names of those who claimed to be the locators, and served every purpose of the law—that is, they identified the claimants and the claim.

The subsequent alteration of the notice by changing the words *west-erly* and *easterly* to *northerly* and *southerly* had no effect upon the rights of the parties. The only purpose of those words was to show in which direction from the discovery point the claim extended one thousand two hundred feet, and in which direction its extent was only three hundred feet. Either set of words served the purpose equally well. No doubt when the vein was first discovered, its course seemed to be east and west; after a certain amount of development, it seemed to run north and south; and the notice was changed for the perfectly innocent and even laudable purpose of giving to all whom it might concern a better description of the claim. The corresponding alteration in the record was made with the same motive—at least the court finds that it was done without any fraudulent intent; and certainly it was wholly immaterial. There was no swinging of the location effected by this change in the notice and record. The claim was never fixed until the stakes were set; and so far as the notice was concerned, it claimed one thousand five hundred feet of the vein, no matter where it might run. If it was good for anything, it was good for what it claimed, pending the marking of the location. The changes and erasures in the record were certainly irregular; and if they had been material, or if they had not been satisfactorily explained, might have afforded good grounds for excluding it from evidence.

But they were satisfactorily explained. They were not designed to defraud any one, and had no such effect. We think that the comments of the District Judge on this matter are very just. Mining recorders are a class of officials that must be treated with a great deal of forbearance and indulgence. They are often entirely ignorant of legal forms, and have no appreciation of the horror with which an ordinary lawyer views the erasure or alteration of records and other documents. Where no fraud or deception is intended, their blunders must not be construed into crimes.

This disposes of the first proposition of appellant. The second and third are entirely without merit, and as they relate to well settled doctrines of the law, they will be very briefly adverted to. There is not the slightest evidence of an intention on the part of the Paymaster location to abandon their claim. The act of Henry in changing the language of the notice on the tenth of October, 1872, proves only that he had abandoned the opinion that the course of the ledge was east and west. So far from proving an intention to abandon a foot of his claim on the ledge, it proves exactly the reverse.

Nor do the facts present a single element of estoppel.

Each party had exactly the same means of information. When the Shark location was made, it was as much the business of its locators to know whether it was on the Paymaster vein, as it was of Ward, the Recorder. The truth probably is, that no one at that time thought the two claims would conflict. It is idle, therefore, to say that any culpable silence on the part of Ward, caused the expenditure of labor and money on the Shark. If the locators of that claim were deceived, it was their fault and they must suffer the consequences.

As to the change in the Paymaster notice from east and west to north and south, that was, as we have seen, wholly immaterial. The simultaneous setting of the stakes entirely superseded the calls of the notice, and was the first thing that ever fixed the boundaries of the claim. If after that the Shark locators continued at work, they did so with their eyes wide open, as they did everything else from the beginning to the end of their attempts to locate the ground. From the outset they had the same opportunities to know the truth that the other party had. If they have any better claim to the property than the defendant, it is not because they were deceived or misled, but only because they can show a technical compliance with the law, while their adversaries cannot. It is upon this ground alone that their case has any semblance of strength, and upon this ground we think it clearly fails. The judgment and order appealed from ought to be affirmed, and it is so ordered.

BEATTY, J.

I concur: LEONARD, J.

Since the foregoing opinion was written two cases (*Gelsich v. Moriarty et al.*, and *Holland et al. v. Mount Auburn G. Q. Mining Company*) have been decided by the Supreme Court of California, in both of which it is assumed, as a point beyond question, that the marking of a mining location on the ground so that its boundaries can be readily traced is absolutely essential to the validity of the claim. This is in perfect accordance with our own views, as above expressed. But in the latter of these cases it seems also to be held that the marking of the center line of the claim is not sufficient to satisfy the requirements of the law. The opinion of the Court is very brief, and no reasons are assigned for the

conclusions reached. We have, however, been led by that decision to thoroughly reconsider our own opinion on this point, and the arguments of counsel *pro* and *con*. The result is that we are satisfied of the correctness of our first conclusion. A mining claim consists of a certain breadth of surface, to be laid off on each side of the line of the croppings, with the mineral deposits included therein. The center line, as a matter of course, is to be a straight line conforming to the general strike of the vein, as nearly as that can be ascertained. The side lines are to be parallel to the center line, and if, as we assume to be the proper construction of the law, the end lines must be parallel and conform to the dip of the vein, which is at right angles to its strike, it follows, with the conclusiveness of a mathematical demonstration that when the center line is once definitely fixed the boundary lines can be traced (that is, followed out) with absolute certainty. It may be that they could not be traced as easily and readily as if stakes were set at the corners, but the difference would be very slight and of no practical consequence. In any case, we think that the law should receive as liberal and beneficial a construction as is consistent with the object which Congress undoubtedly had in view in passing it. That object, we are satisfied, was not to save intending locators a slight amount of labor in tracing older claims, but it was to make the boundaries of such older claims certain and immovable; to put an end forever to the shifting and floating of claims; to do away with an existing and intolerable evil. The whole object of the law is accomplished whenever, from the monuments on the ground, the boundaries of a mining claim can be traced with absolute certainty and without any practical difficulty, and for that purpose a definitely fixed center line is sufficient.

BEATTY, J.

I concur: LEONARD, J.

BY HAWLEY, C. J., CONCURRING.

I concur in the conclusions reached by the Court, that the judgment of the District Court ought to be affirmed; but I am unwilling to give an unqualified approval of the construction given to the mining laws of the United States.

If I entertained the opinion, as expressed by the Court, that "it is a surface parallelogram not less than fifty feet in width that must be located;" that the location on a vein "must be made by taking up a piece of land to include it;" that a vein "can only be located by means of a surface claim, and held only to the extent that it is included in the surface lines," and if—upon these points—I agreed "entirely with the views of counsel for appellant," I should be inclined to agree with their conclusions that it is the surface location that "must be distinctly marked on the ground so that its boundaries can be distinctly traced."

But I do not believe that it was the intention of Congress, by the passage of the several Acts referred to in the opinion of the Court, to produce an entire revolution in the system of locating mining claims. Some very important changes have been made and the rights of the locators have been enlarged and made more specific; but, in my judgment, it is—as it was under the old system—the vein of quartz, the lode, that is the principal thing constituting the location. The surface ground is but

an incident thereto. The location of such a mining claim is distinctly marked on the ground so that its boundaries can be readily traced, by the placing of stakes along the lode and at the ends of the location, or by such other monuments or marks as will clearly designate the number of feet in length and the particular lode located. In my judgment, the location need not, necessarily, be the taking up of "a piece of land" in the form of a parallelogram. When the vein or lode is sufficiently identified and marked, as above stated, the laws of the local district fix the number of feet in width—of the surface ground—to which the locator is entitled. It being, of course, understood that, "no claim shall extend more than three hundred feet on each side of the middle of the vein at the surface, nor shall any claim be limited by any mining regulation to less than twenty-five feet on each side of the middle of the vein at the surface."

I differ with the court upon another point discussed in the opinion. I think that after the vein or lode is properly located the locator thereof has the right to fifteen hundred feet along the course of the lode, "in whatever direction it runs, irrespective of the vertical side lines of the surface boundaries" (dissenting opinion, *Golden Fleece v. Cable Consolidated*, 12 Nev., 331), and that he would only be entitled to fifteen hundred feet in length, although the vein took such a course as to embrace more than fifteen hundred feet within the end lines of his surface location.

HAWLEY, C. J.

EXPENDITURES.

TRAVELING EXPENSES OF STATE MINERALOGIST.

| Date. | Claimant. | Character. | Amount. |
|------------------------------------|-----------------------|--------------------------------|------------|
| 1877. | | | |
| March 7 | H. R. Whitehill..... | Expenses per voucher..... | \$ 39 75 |
| May 22..... | Chris. Johnson..... | Ranching two horses, 1876..... | 60 00 |
| January 4..... | A. M. Taylor..... | Ranching two horses | 70 00 |
| December 3 ... | A. M. Taylor..... | Ranching two horses | 15 00 |
| 1878. | | | |
| August 5..... | W. M. Carey..... | Ranching two horses | 80 00 |
| August 5..... | W. D. Torreyson | Repairs on buggy | 158 50 |
| September 3... | D. G. Kitzmeyer..... | Repairing harness, etc..... | 10 00 |
| October 7..... | H. R. Whitehill..... | Traveling expenses..... | 681 00 |
| December 2 ... | H. R. Whitehill..... | Traveling expenses..... | 146 25 |
| Total..... | | | \$1,260 50 |
| Credit, sale of 2 horses and buggy | | | \$500 00 |

STATE OF NEVADA,
County of Ormsby. }

H. R. Whitehill, being duly sworn, deposes and says that the foregoing is a true account.

H. R. WHITEHILL.

Subscribed and sworn to before me, this fourteenth day of
January, 1878.



CHARLES MARTIN,
Notary Public,
Ormsby County, Nevada.

SUPPLEMENT.

Showing the Proceeds of Mines in the State
of Nevada,

DURING THE YEARS 1871-72-73-74-75-76-77,

AND

1st, 2d, and 3d QUARTERS OF 1878.

Compiled from County Assessors returns in State Controller's Office.

ELKO

| Name of Mine or Owner. | FIRST QUARTER. | | | SECOND QUARTER. | | |
|-------------------------|----------------|---------|--------------|-----------------|---------|--------------|
| | Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. |
| Austin..... | 14 | 793 | \$ 1,222 16 | ..... | ..... | ..... |
| Grand Prize..... | 600 | ..... | 80,011 16 | 1,700 | ..... | \$176,928 31 |
| Hussey..... | 45 | 67 | 4,419 37 | 85 | 1,760 | 7,772 62 |
| Leopard..... | 1,091 | ..... | 35,290 00 | ..... | ..... | ..... |
| Mineral Hill..... | 124 | ..... | 20,516 91 | ..... | ..... | ..... |
| Panther..... | 50 | ..... | 6,743 20 | ..... | ..... | ..... |
| Navajo..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Tailings (Leopard)..... | 2,374 | ..... | 19,324 00 | 210 | ..... | 2,100 00 |
| Totals..... | 4,298 | 860 | \$167,526 80 | 1,995 | 1,760 | \$186,800 93 |

ESMERALDA

| Name of Mine or Owner. | FIRST QUARTER. | | | SECOND QUARTER. | | |
|-----------------------------|----------------|---------|--------------|-----------------|---------|--------------|
| | Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. |
| Cummings & Co..... | 3 | 1,447 | \$ 250 21 | ..... | ..... | ..... |
| Mount Diablo..... | 140 | ..... | 7,030 00 | ..... | ..... | ..... |
| Northern Belle..... | 9,275 | ..... | 413,681 65 | 9,010 | ..... | \$380,908 36 |
| Norvell & McGrew..... | 33 | 1,299 | 862 04 | ..... | ..... | ..... |
| Potter & Sallee..... | 81 | 1,428 | 9,905 73 | ..... | ..... | ..... |
| Traver, P. S..... | 62 | 474 | 1,226 64 | ..... | ..... | ..... |
| Wheeler..... | 210 | ..... | 5,161 32 | 484 | 100 | 19,325 55 |
| David Wilson..... | ..... | ..... | ..... | 185 | ..... | 4,065 58 |
| Dolores..... | ..... | ..... | ..... | 1,006 | ..... | 15,522 68 |
| Midas..... | ..... | ..... | ..... | 105 | 1,000 | 3,209 50 |
| Strosnider..... | ..... | ..... | ..... | 57 | 1,000 | 1,568 00 |
| Wm. Brannan..... | ..... | ..... | ..... | 64 | ..... | 2,560 00 |
| Wm. Hayes..... | ..... | ..... | ..... | 70 | ..... | 1,791 83 |
| Endowment..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Indian Queen..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Williams..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Bodfish..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Dunn..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Grundy & Strosnider..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Lavell..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Lodi..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Robinson, D. R..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Vanderbilt & Pocotillo..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Tailings..... | 60 | ..... | 570 07 | ..... | ..... | ..... |
| Totals..... | 9,866 | 648 | \$438,687 66 | 10,982 | 100 | \$428,951 50 |

COUNTY—1877.

| THIRD QUARTER | | | FOURTH QUARTER. | | | TOTALS. | | |
|---------------|---------|--------------|-----------------|---------|--------------|---------|---------|----------------|
| Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. |
| 3,000 | | \$277,484 79 | 3,951 | ..... | \$354,289 94 | 14 | 793 | \$ 1,222 16 |
| | | | 414 | ..... | 18,844 40 | 9,251 | ..... | 888,714 20 |
| | | | 1,084 | ..... | 67,647 00 | 544 | 1,827 | 31,036 39 |
| | | | | | | 2,175 | ..... | 102,937 00 |
| | | | | | | 124 | ..... | 20,516 91 |
| | | | | | | 50 | ..... | 6,743 20 |
| | | | 200 | ..... | 12,000 00 | 200 | ..... | 12,000 00 |
| 225 | | 3,375 00 | ..... | ..... | ..... | 2,809 | ..... | 24,799 00 |
| 3,225 | | \$280,859 79 | 5,649 | ..... | \$440,781 34 | 15,168 | 620 | \$1,075,968 86 |

COUNTY—1877.

| THIRD QUARTER. | | | FOURTH QUARTER. | | | TOTALS. | | |
|----------------|---------|--------------|-----------------|---------|--------------|---------|---------|----------------|
| Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. |
| | | | | | | 3 | 1,447 | \$ 250 21 |
| | | | | | | 140 | ..... | 7,030 00 |
| 7,137 | | \$312,228 95 | 4,300 | ..... | \$163,938 40 | 29,722 | ..... | 1,270,757 36 |
| | | | | | | 33 | 1,299 | 862 04 |
| | | | | | | 81 | 1,428 | 9,905 73 |
| | | | | | | 62 | 474 | 1,226 64 |
| | | | 618 | ..... | 26,905 00 | 1,312 | 100 | \$1,391 87 |
| | | | 100 | ..... | 1,826 00 | 285 | ..... | 6,891 58 |
| | | | | | | 1,006 | ..... | 15,522 68 |
| | | | | | | 105 | 1,000 | 3,209 50 |
| | | | 249 | ..... | 6,727 00 | 306 | 1,000 | 8,295 00 |
| | | | | | | 64 | ..... | 2,560 00 |
| | | | | | | 70 | ..... | 1,791 83 |
| 906 | | 34,358 16 | 1,083 | ..... | 30,525 83 | 1,989 | ..... | 64,883 99 |
| 63 | 1,500 | 9,358 50 | ..... | ..... | ..... | 63 | 1,500 | 9,358 50 |
| 309 | 1,500 | 4,050 64 | ..... | ..... | ..... | 309 | 1,500 | 4,050 64 |
| | | | 23 | ..... | 722 00 | 23 | ..... | 722 00 |
| | | | 132 | ..... | 4,884 00 | 132 | ..... | 4,884 00 |
| | | | 114 | ..... | 2,337 00 | 114 | ..... | 2,337 00 |
| | | | 22 | 436 | 943 87 | 22 | 436 | 943 87 |
| | | | 21 | 1,800 | 754 32 | 21 | 1,800 | 754 32 |
| | | | 66 | ..... | 2,244 00 | 66 | ..... | 2,244 00 |
| | | | 678 | ..... | 39,478 79 | 678 | ..... | 39,478 79 |
| | | | 60 | ..... | 570 07 | 60 | ..... | 570 07 |
| 8,416 | 1,000 | \$359,996 25 | 7,467 | 236 | \$282,856 28 | 36,731 | 1,984 | \$1,508,491 69 |

EUREKA

| Name of Mine or Owner. | FIRST QUARTER. | | | SECOND QUARTER. | | |
|--------------------------|----------------|---------|--------------|-----------------|---------|--------------|
| | Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. |
| Alfozgis..... | 7 | 1,175 | \$ 584 00 | ..... | ..... | ..... |
| Banner..... | 45 | 1,546 | 3,405 32 | 34 | 56 | 1,320 39 |
| British..... | 5 | 1,526 | 413 26 | ..... | ..... | ..... |
| Delaware..... | 2 | 173 | 113 43 | ..... | ..... | ..... |
| Eagle..... | 21 | 283 | 2,047 11 | ..... | ..... | ..... |
| Essex..... | 3 | 9 | 138 05 | ..... | ..... | ..... |
| Eureka Consolidated..... | 6,091 | 1,000 | 246,975 55 | 1,952 | ..... | 101,224 80 |
| Florida..... | 4 | 1,049 | 255 02 | 4 | 1,732 | 250 89 |
| Fourth of July..... | 11 | 488 | 773 57 | ..... | ..... | ..... |
| Garrison..... | 134 | 571 | 9,242 63 | ..... | ..... | ..... |
| Geddes & Bertrand..... | 637 | ..... | 26,000 00 | ..... | ..... | ..... |
| Holly..... | 77 | 1,486 | 5,369 24 | ..... | ..... | ..... |
| Home Ticket..... | 58 | 380 | 2,924 24 | 46 | 1,995 | 2,330 87 |
| K. K. Consolidated..... | 3,376 | 116 | 102,692 47 | 4,033 | 328 | 123,294 11 |
| Last Chance..... | 13 | 1,101 | 1,478 55 | ..... | ..... | ..... |
| Lone Pine..... | 29 | 396 | 6,195 47 | ..... | ..... | ..... |
| Macon City..... | 39 | 1,565 | 2,519 15 | 9 | 1,820 | 448 74 |
| Mortimer..... | 19 | 407 | 1,648 97 | ..... | ..... | ..... |
| Mountain Boy..... | 14 | 752 | 567 78 | ..... | ..... | ..... |
| Orange..... | 5 | 1,667 | 395 73 | ..... | ..... | ..... |
| Phoenix..... | 61 | 650 | 1,420 47 | ..... | ..... | ..... |
| Pioneer..... | 6 | 292 | 483 41 | 2 | 978 | 126 92 |
| Richmond..... | 9,687 | 901 | 408,829 03 | 2,349 | ..... | 89,463 15 |
| Silver Fleece..... | 15 | 1,755 | 2,233 00 | ..... | ..... | ..... |
| Tamehill..... | 5 | 1,389 | 319 96 | ..... | ..... | ..... |
| Tiger..... | 8 | 180 | 340 56 | ..... | ..... | ..... |
| Wide West..... | 8 | 1,250 | 603 65 | ..... | ..... | ..... |
| William..... | 1 | 622 | 105 50 | ..... | ..... | ..... |
| Aams Hill..... | ..... | ..... | ..... | 14 | 1,815 | 458 18 |
| Bowman..... | ..... | ..... | ..... | 1 | 40 | 97 34 |
| Bullwhacker..... | ..... | ..... | ..... | 45 | 1,460 | 1,934 29 |
| El Dorado..... | ..... | ..... | ..... | 5 | 130 | 360 40 |
| El Dorado No. 2..... | ..... | ..... | ..... | 4 | 1,360 | 192 47 |
| Enterprise..... | ..... | ..... | ..... | 1 | 1,830 | 83 68 |
| Excelsior..... | ..... | ..... | ..... | 8 | 590 | 380 07 |
| Grey Eagle..... | ..... | ..... | ..... | 4 | 460 | 138 90 |
| Hamburg..... | ..... | ..... | ..... | 2,166 | 1,888 | 75,177 00 |
| Ida Ellmore..... | ..... | ..... | ..... | 2 | 1,665 | 754 08 |
| Industry..... | ..... | ..... | ..... | 21 | 570 | 1,833 21 |
| Pioneer..... | ..... | ..... | ..... | 2 | 1,691 | 204 81 |
| Rocky Point..... | ..... | ..... | ..... | 22 | 150 | 661 97 |
| Silver State..... | ..... | ..... | ..... | 1 | 276 | 47 98 |
| Stamboul..... | ..... | ..... | ..... | 5 | 676 | 279 23 |
| Sterling..... | ..... | ..... | ..... | 4 | 128 | 421 81 |
| Tindal..... | ..... | ..... | ..... | 1 | 1,428 | 101 88 |
| Apache..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Atlas..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Bonanza..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Bald Eagle..... | ..... | ..... | ..... | ..... | ..... | ..... |

COUNTY—1877.

| THIRD QUARTER. | | | FOURTH QUARTER. | | | TOTALS. | | |
|----------------|---------|--------------|-----------------|---------|--------------|---------|---------|--------------|
| Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. |
| 57 | 1,418 | \$ 2,407 10 | 12 | 1,367 | \$ 718 37 | 7 | 1,175 | \$ 584 00 |
| 116 | 1,272 | 15,103 51 | 4 | 1,454 | 304 48 | 150 | 387 | 7,851 18 |
| 12 | 255 | 600,649 97 | 37 | 1,050 | 4,095 33 | 5 | 1,526 | 413 26 |
| | | | 16 | 949 | 848,410 18 | 6 | 1,627 | 417 91 |
| | | | | | | 175 | 605 | 21,245 95 |
| | | | | | | 3 | 9 | 138 05 |
| | | | | | | 8,072 | 204 | 1,797,260 50 |
| | | | | | | 9 | 781 | 505 91 |
| | | | 689 | 270 | 44,570 04 | 11 | 488 | 773 57 |
| 5 | 593 | 168 59 | 6 | 1,778 | 328 44 | 823 | 741 | 53,812 67 |
| 44 | 1,816 | 2,055 26 | 58 | 560 | 1,836 46 | 649 | 371 | 26,497 03 |
| 4,073 | 1,560 | 97,586 90 | 4,157 | 690 | 115,669 00 | 77 | 1,486 | 5,369 24 |
| | | | | | | 208 | 751 | 9,149 83 |
| | | | | | | 15,640 | 694 | 439,242 48 |
| | | | | | | 13 | 1,101 | 1,478 55 |
| | | | | | | 29 | 396 | 6,195 47 |
| 7 | 1,316 | 985 82 | 14 | 276 | 925 11 | 71 | 977 | 4,878 82 |
| | | | | | | 19 | 407 | 1,648 97 |
| 3 | 1,426 | 217 07 | 17 | 1,082 | 1,319 62 | 35 | 1,260 | 2,104 47 |
| 38 | 305 | 1,945 62 | 3 | 80 | 130 99 | 47 | 52 | 2,472 34 |
| | | | | | | 61 | 650 | 1,420 47 |
| 5 | 438 | 272 55 | 13 | 1,350 | 480 12 | 27 | 1,058 | 1,363 00 |
| | | | | | | 12,036 | 901 | 498,292 18 |
| | | | 12 | 706 | 2,126 27 | 28 | 461 | 4,359 27 |
| | | | | | | 5 | 1,389 | 319 96 |
| | | | | | | 8 | 180 | 340 56 |
| 3 | 722 | 176 84 | | | | 11 | 1,972 | 780 49 |
| | | | | | | 1 | 622 | 105 50 |
| 1 | 1,018 | 92 33 | | | | 16 | 833 | 550 51 |
| | | | | | | 1 | 40 | 97 34 |
| 121 | 410 | 5,732 87 | 154 | 1,581 | 5,256 17 | 321 | 1,451 | 12,923 33 |
| 15 | 553 | 1,063 06 | 40 | 1,217 | 3,228 48 | 60 | 1,900 | 4,651 94 |
| | | | | | | 4 | 1,360 | 192 47 |
| | | | | | | 1 | 1,830 | 83 68 |
| 72 | 628 | 1,889 93 | | | | 80 | 1,218 | 2,290 00 |
| | | | | | | 4 | 460 | 138 90 |
| | | | | | | 2,166 | 1,888 | 75,177 00 |
| | | | | | | 2 | 1,665 | 754 08 |
| 32 | 896 | 4,535 77 | 101 | 144 | 14,133 37 | 154 | 1,610 | 20,502 35 |
| | | | | | | 2 | 1,691 | 204 81 |
| | | | 4 | 625 | 333 45 | 26 | 775 | 988 42 |
| | | | | | | 1 | 276 | 47 08 |
| | | | | | | 5 | 676 | 279 23 |
| 2 | 666 | 193 91 | 3 | 1,253 | 300 57 | 10 | 47 | 916 29 |
| | | | | | | 1 | 1,428 | 101 88 |
| 2 | 964 | 204 12 | | | | 2 | 964 | 204 12 |
| 16 | 70 | 465 08 | | | | 16 | 70 | 465 08 |
| | 1,296 | 159 38 | | | | | 1,296 | 159 38 |
| 34 | 157 | 3,216 98 | | | | 34 | 157 | 3,216 98 |

EUREKA

| Name of Mine or Owner. | FIRST QUARTER. | | | SECOND QUARTER. | | |
|------------------------|----------------|---------|--------------|-----------------|---------|--------------|
| | Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. |
| Grant | | | | | | |
| Kentuck. | | | | | | |
| Matamoras..... | | | | | | |
| Phil. Sheridan | | | | | | |
| Richmond Con | | | | | | |
| Republic | | | | | | |
| Star..... | | | | | | |
| Silver Corner..... | | | | | | |
| Silver West..... | | | | | | |
| Stella | | | | | | |
| Star of the West | | | | | | |
| Troy | | | | | | |
| Cassidy | | | | | | |
| Connolly | | | | | | |
| Diligent | | | | | | |
| Good Hope..... | | | | | | |
| General Lee..... | | | | | | |
| Hamilton | | | | | | |
| Hoosac..... | | | | | | |
| Jackson..... | | | | | | |
| Lemon..... | | | | | | |
| Magnet | | | | | | |
| Pleiades | | | | | | |
| Williamsburg..... | | | | | | |
| Uncle Sam | | | | | | |
| Vulcan | | | | | | |
| Other mines..... | | | | | | |
| Totals | 20,391 | 629 | \$828,075 12 | 10,746 | 1,066 | \$401,590 17 |

HUMBOLDT

| Name of Mine or Owner. | FIRST QUARTER. | | | SECOND QUARTER. | | |
|------------------------|----------------|---------|--------------|-----------------|---------|--------------|
| | Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. |
| Arizona | 411 | ..... | \$10,069 00 | 727 | ..... | \$13,813 00 |
| Hurricane | 694 | 650 | 21,786 75 | 530 | 230 | 15,732 48 |
| Rye Patch..... | 421 | ..... | 10,942 78 | 779 | 1,000 | 42,595 11 |
| Tailings..... | 2,720 | ..... | 13,602 21 | 4,450 | ..... | 18,356 00 |
| Totals | 4,246 | 650 | \$56,400 74 | 6,486 | 1,230 | \$90,496 59 |

COUNTY—Continued—1877.

| THIRD QUARTER. | | | FOURTH QUARTER. | | | TOTALS. | | |
|----------------|---------|--------------|-----------------|---------|----------------|---------|---------|----------------|
| Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. |
| 5 | 330 | 1,067 76 | ..... | ..... | ..... | 5 | 330 | 1,067 76 |
| 4 | 135 | 352 29 | ..... | ..... | ..... | 4 | 135 | 352 29 |
| 460 | 1,972 | 31,055 72 | 122 | 1,201 | 11,761 88 | 583 | 1,173 | 42,817 50 |
| 2 | 318 | 87 51 | ..... | ..... | ..... | 2 | 318 | 87 51 |
| 2,674 | 1,340 | 135,742 90 | 11,546 | 230 | 650,193 58 | 14,220 | 1,570 | 785,936 48 |
| 6 | 351 | 1,505 00 | ..... | ..... | ..... | 6 | 351 | 1,505 00 |
| 23 | 789 | 4,947 69 | 1 | 1,764 | 100 86 | 24 | 553 | 5,048 55 |
| 7 | 1,654 | 592 06 | 20 | 629 | 1,956 20 | 28 | 283 | 2,548 26 |
| 1 | 1,450 | 66 44 | 22 | 453 | 611 17 | 23 | 1,903 | 677 61 |
| 4 | 1,090 | 242 98 | 5 | 1,203 | 368 51 | 10 | 293 | 611 49 |
| 2 | 828 | 223 90 | 6 | 151 | 636 02 | 8 | 977 | 859 92 |
| 20 | 57 | 3,579 90 | ..... | ..... | ..... | 20 | 57 | 3,579 90 |
| ..... | ..... | ..... | 2 | 798 | 354 06 | 2 | 798 | 354 06 |
| ..... | ..... | ..... | 415 | 380 | 15,645 92 | 415 | 380 | 15,645 92 |
| ..... | ..... | ..... | 2 | 891 | 107 31 | 2 | 891 | 107 31 |
| ..... | ..... | ..... | 6 | 140 | 382 74 | 6 | 140 | 382 74 |
| ..... | ..... | ..... | 19 | 498 | 1,154 72 | 19 | 498 | 1,154 72 |
| ..... | ..... | ..... | 2 | 1,818 | 172 90 | 2 | 1,818 | 172 90 |
| ..... | ..... | ..... | 169 | 1,580 | 6,539 47 | 169 | 1,580 | 6,539 47 |
| ..... | ..... | ..... | 342 | 1,935 | 9,398 98 | 342 | 1,935 | 9,398 98 |
| ..... | ..... | ..... | 9 | 1,301 | 436 68 | 9 | 1,301 | 436 68 |
| ..... | ..... | ..... | 9 | 732 | 201 37 | 9 | 732 | 201 37 |
| ..... | ..... | ..... | 31 | 503 | 1,759 08 | 31 | 503 | 1,759 08 |
| ..... | ..... | ..... | 26 | 100 | 1,694 35 | 26 | 100 | 1,694 35 |
| ..... | ..... | ..... | 8 | 1,255 | 657 66 | 8 | 1,255 | 657 66 |
| ..... | ..... | ..... | 6 | 782 | 690 78 | 6 | 782 | 690 78 |
| ..... | ..... | ..... | 13 | 511 | 1,191 55 | 18 | 1,357 | 1,568 95 |
| 20,077 | 227 | \$915,255 73 | 35,122 | 1,580 | \$1,753,957 63 | 86,337 | 1,502 | \$3,898,878 65 |

COUNTY—1877.

| THIRD QUARTER. | | | FOURTH QUARTER. | | | TOTALS. | | |
|----------------|---------|--------------|-----------------|---------|--------------|---------|---------|--------------|
| Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. |
| 575 | ..... | \$13,369 00 | 629 | ..... | \$11,626 00 | 2,342 | ..... | \$ 48,877 00 |
| ..... | ..... | ..... | ..... | ..... | ..... | 1,224 | 880 | 37,519 23 |
| 460 | 1,000 | 29,285 71 | 945 | 600 | 61,445 92 | 2,606 | 600 | 144,269 52 |
| 2,600 | ..... | 14,300 00 | 6,400 | ..... | 30,300 00 | 16,170 | ..... | 76,558 21 |
| 3,635 | 1,000 | \$56,954 71 | 7,974 | 600 | \$103,371 92 | 22,342 | 1,480 | \$307,223 96 |

LANDER

| Name of Mine or Owner. | FIRST QUARTER. | | | SECOND QUARTER. | | |
|------------------------|----------------|---------|--------------|-----------------|---------|--------------|
| | Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. |
| Battle Mountain..... | 168 | 1,989 | \$ 11,337 45 | 240 | 1,136 | \$16,065 53 |
| Manhattan | 1,258 | ..... | 121,435 70 | 871 | 1,500 | 71,270 02 |
| Eclipse ..... | ..... | ..... | ..... | 14 | 570 | 2,744 84 |
| Esther ..... | ..... | ..... | ..... | 29 | 660 | 5,710 51 |
| Home Stake..... | ..... | ..... | ..... | 10 | 820 | 2,329 21 |
| Cooper, H. H ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Finnegan, M ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Hill, J. A. .... | ..... | ..... | ..... | ..... | ..... | ..... |
| Leigh & Co. .... | ..... | ..... | ..... | ..... | ..... | ..... |
| Lee, Thos..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Morris & Cable..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Morrow, R. .... | ..... | ..... | ..... | ..... | ..... | ..... |
| Post & Ward..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Cook & Co ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Defiance ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Rice, John ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Roseber..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Other mines..... | 196 | 460 | 42,100 34 | 128 | 1,276 | 25,387 64 |
| Totals..... | 1,623 | 449 | \$174,873 49 | 1,294 | 1,962 | \$123,507 75 |

COUNTY—1877.

| THIRD QUARTER. | | | FOURTH QUARTER. | | | TOTALS. | | |
|----------------|---------|--------------|-----------------|---------|--------------|---------|---------|--------------|
| Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. |
| 366 | 1,826 | \$20,368 07 | 202 | 480 | \$ 9,070 31 | 978 | 1,431 | \$ 56,841 36 |
| 509 | 1,250 | 60,886 90 | 1,503 | 500 | 167,473 34 | 4,142 | 1,250 | 411,065 96 |
| ..... | ..... | ..... | ..... | ..... | ..... | 14 | 570 | 2,744 84 |
| 21 | 1,556 | 4,680 54 | 19 | 220 | 4,266 58 | 70 | 436 | 14,657 63 |
| ..... | ..... | ..... | 22 | 1,778 | 5,588 12 | 33 | 598 | 7,917 33 |
| 4 | 790 | 2,545 84 | 3 | 1,521 | 1,564 07 | 8 | 312 | 4,105 91 |
| 5 | 904 | 1,891 68 | ..... | ..... | ..... | 5 | 904 | 1,891 68 |
| 2 | 480 | 242 65 | ..... | ..... | ..... | 2 | 480 | 242 65 |
| 6 | 1,388 | 1,540 38 | ..... | ..... | ..... | 6 | 1,388 | 1,540 38 |
| 4 | 328 | 2,037 02 | ..... | ..... | ..... | 4 | 328 | 2,037 02 |
| 5 | 280 | 3,113 23 | 5 | 346 | 1,559 65 | 10 | 626 | 4,672 88 |
| 9 | 1,670 | 2,123 17 | ..... | ..... | ..... | 9 | 1,670 | 2,123 17 |
| 31 | 1,150 | 5,995 34 | ..... | ..... | ..... | 31 | 1,150 | 5,995 34 |
| ..... | ..... | ..... | 3 | 888 | 852 97 | 3 | 888 | 852 97 |
| ..... | ..... | ..... | 8 | 380 | 803 51 | 8 | 380 | 803 51 |
| ..... | ..... | ..... | 3 | 1,574 | 751 88 | 3 | 1,574 | 751 88 |
| ..... | ..... | ..... | 1 | 400 | 90 40 | 1 | 400 | 90 40 |
| ..... | ..... | ..... | ..... | ..... | ..... | 324 | 1,736 | 67,487 98 |
| | | | | | | | | |
| 967 | 1,622 | \$105,424 82 | 1,773 | 88 | \$192,020 83 | 5,659 | 121 | \$595,828 89 |

LINCOLN

| Name of Mine or Owner. | FIRST QUARTER. | | | SECOND QUARTER. | | |
|--------------------------|----------------|---------|--------------|-----------------|---------|--------------|
| | Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. |
| Alps..... | 37 | 725 | \$ 2,026 58 | 193 | 90 | \$ 4,631 95 |
| Chief of the Hill..... | 3 | 875 | 242 84 | | | |
| Desdemona..... | 14 | 875 | 1,074 31 | 7 | 276 | 597 48 |
| Great Eastern..... | 23 | 848 | 1,396 25 | | | |
| Huhn & Hunt..... | 22 | | 1,446 15 | | | |
| Hume, A. W..... | 2 | 625 | 580 69 | | | |
| Mazeppa..... | 22 | 1,600 | 1,428 59 | | | |
| Meadow Valley..... | 324 | 998 | 11,079 00 | 380 | 1,880 | 16,628 27 |
| Monte del Rey..... | 10 | 1,100 | 553 19 | | | |
| Montgomery..... | 10 | 1,550 | 985 75 | 4 | 1,744 | 393 95 |
| Osborn & Co..... | 36 | | 3,045 60 | | | |
| Raymond & Ely..... | 296 | 1,820 | 24,590 31 | 820 | 1,598 | 71,909 86 |
| Techatticup..... | 45 | | 2,730 00 | | | |
| Chance..... | | | | 4 | 1,298 | 1,056 04 |
| Iron..... | | | | 2 | 508 | 439 75 |
| Mitchell..... | | | | 8 | 445 | 1,229 83 |
| Nevada..... | | | | 63 | 1,235 | 3,069 10 |
| Pioche..... | | | | 21 | 1,296 | 1,887 77 |
| Silver Park..... | | | | 140 | | 3,900 00 |
| Washington & Creole..... | | | | 32 | 320 | 620 47 |
| Fallis..... | | | | | | |
| Jack Rabbit..... | | | | | | |
| Peavine..... | | | | | | |
| Clute, E. R..... | | | | | | |
| Day..... | | | | | | |
| National..... | | | | | | |
| Tailings (R. & E.)..... | | | | 5,766 | | 49,758 41 |
| Totals..... | 849 | 1,016 | \$51,179 26 | 7,465 | 690 | \$156,122 88 |

COUNTY—1877.

| THIRD QUARTER. | | | FOURTH QUARTER. | | | TOTALS. | | |
|----------------|---------|--------------|-----------------|---------|--------------|---------|---------|--------------|
| Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. |
| 887 | 1,090 | \$23,082 44 | 853 | 1,530 | \$47,673 71 | 1,971 | 1,435 | \$77,414 68 |
| 34 | 1,470 | 2,326 83 | | | | 3 | 875 | 242 84 |
| | | | | | | 56 | 621 | 3,998 62 |
| | | | | | | 23 | | 1,446 15 |
| | | | | | | 22 | 848 | 1,396 25 |
| | | | | | | 2 | 625 | 580 69 |
| | | | | | | 22 | 1,600 | 1,428 59 |
| 482 | 1,100 | 39,461 36 | 220 | 1,377 | 14,579 07 | 1,408 | 1,355 | 81,747 70 |
| | | | | | | 10 | 1,100 | 553 19 |
| | | | | | | 15 | 1,294 | 1,379 70 |
| | | | | | | 36 | | 3,045 60 |
| 509 | | 20,360 00 | 1,121 | 1,186 | 69,379 27 | 2,748 | 604 | 186,239 44 |
| | | | 257 | 400 | 14,698 47 | 302 | 400 | 17,428 47 |
| | | | | | | 4 | 1,298 | 1,056 04 |
| | | | | | | 2 | 508 | 439 75 |
| | | | | | | 8 | 445 | 1,229 83 |
| | | | 25 | 570 | 1,509 84 | 88 | 1,805 | 4,578 94 |
| | | | 7 | 1,440 | 506 94 | 29 | 736 | 2,394 71 |
| | | | | | | 140 | | 3,900 00 |
| | | | 6 | 1,920 | 977 71 | 39 | 240 | 1,598 18 |
| 2 | 900 | 166 00 | | | | 2 | 900 | 166 00 |
| 11 | 1,205 | 4,282 86 | | | | 11 | 1,205 | 4,282 86 |
| 8 | 1,088 | 505 00 | | | | 8 | 1,088 | 505 00 |
| | | | 18 | 990 | 625 88 | 18 | 990 | 625 88 |
| | | | 41 | 129 | 14,555 82 | 41 | 129 | 14,555 82 |
| | | | 10 | | 583 90 | 10 | | 583 90 |
| 5,387 | | 50,462 00 | 5,166 | | 43,356 13 | 16,319 | | 143,576 54 |
| 7,323 | 853 | \$140,646 49 | 7,278 | 1,542 | \$208,146 74 | 22,917 | 101 | \$556,095 37 |

LYON

| Name of Mine or Owner. | FIRST QUARTER. | | | SECOND QUARTER. | | |
|--------------------------|----------------|---------|--------------|-----------------|---------|--------------|
| | Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. |
| <i>Tailings.</i> | | | | | | |
| Buckeye | 754 | | \$ 4,966 21 | | | |
| William McLaughlin | | | | 61 | | \$ 2,501 00 |
| Atlanta Mill | | | | | | |
| Bacon Mill | | | | | | |
| Excelsior Mill | | | | | | |
| Lyon M. and M. Co. | | | | | | |
| French Mill | | | | | | |
| Union M. and M. Co. | | | | | | |
| Woodworth Mill | | | | | | |
| Others | 1,657 | 1,000 | 21,651 60 | 20,525 | | 135,084 84 |
| Totals | 2,411 | 1,000 | \$26,617 81 | 20,586 | | \$137,584 84 |

NYE

| Name of Mine or Owner. | FIRST QUARTER. | | | SECOND QUARTER. | | |
|---------------------------|----------------|---------|--------------|-----------------|---------|--------------|
| | Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. |
| Adriatic | | 1,457 | \$ 53 82 | | | |
| Dominion | 5 | 1,109 | 1,174 26 | | | |
| Gila | 1 | 260 | 108 29 | | | |
| Gladiator | 3 | 1,146 | 535 14 | | | |
| Highbridge | 4 | 978 | 1,080 03 | | | |
| Illinois | 88 | | 4,400 00 | 185 | 671 | \$ 25,842 83 |
| Last Chance | 77 | | 2,310 00 | | | |
| McCleary, A. M. | 5 | 182 | 287 91 | | | |
| Pasqual, Felix | 1 | 1,474 | 678 29 | | | |
| Purcell, M. | | 529 | 52 98 | | | |
| Squire, S. H. | 1 | 200 | 349 81 | | | |
| Tybo Con. | 5,705 | | 174,081 43 | | | |
| West Side | 2 | 622 | 67 55 | | | |
| E. P. Sure | | | | | 569 | 204 10 |
| Gilco | | | | 13 | 1,322 | 4,066 90 |
| Q. G. & Bunker Hill | | | | 7,350 | | 238,591 22 |
| Storm King | | | | 324 | | 15,903 95 |
| Clipper | | | | | | |
| North San Pedro | | | | | | |
| Stonewall | | | | | | |
| Other mines | | | | | | |
| Tailings | 720 | | 14,877 84 | | | |
| Totals | 6,615 | 1,957 | \$200,057 35 | 7,873 | 562 | \$284,609 00 |

COUNTY—1877.

| THIRD QUARTER. | | | FOURTH QUARTER. | | | TOTALS. | | |
|----------------|---------|--------------|-----------------|---------|--------------|---------|---------|--------------|
| Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. |
| | | | | | | 754 | ..... | \$ 4,966 21 |
| | | | | | | 61 | ..... | 2,501 00 |
| 5,000 | | \$38,052 62 | ..... | ..... | ..... | 5,000 | ..... | 38,052 62 |
| 245 | | 7,217 37 | 400 | ..... | \$ 8,905 87 | 645 | ..... | 16,123 24 |
| 3,317 | | 25,425 84 | 1,252 | ..... | 6,781 13 | 4,569 | ..... | 32,206 97 |
| 8,911 | | 33,567 00 | 10,247 | ..... | 42,114 54 | 19,158 | ..... | 75,681 54 |
| 645 | | 14,459 22 | 518 | ..... | 12,876 81 | 1,163 | ..... | 27,336 03 |
| | | | 3,500 | ..... | 35,074 44 | 3,500 | ..... | 35,074 44 |
| 336 | | 3,483 44 | 1,697 | ..... | 13,854 88 | 2,033 | ..... | 17,338 32 |
| | | | | | | 2,18 | 1,000 | 156,736 44 |
| 18,454 | | \$122,205 49 | 17,614 | ..... | \$119,607 07 | 59,065 | 1,000 | \$406,016 81 |

COUNTY—1877.

| THIRD QUARTER. | | | FOURTH QUARTER. | | | TOTALS. | | |
|----------------|---------|--------------|-----------------|---------|--------------|---------|---------|--------------|
| Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. |
| ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1,457 | \$ 53 82 |
| ..... | ..... | ..... | ..... | ..... | ..... | 5 | 1,109 | 1,174 26 |
| 9 | 455 | \$ 1,839 00 | 367 | 1,570 | \$28,935 22 | 378 | 285 | 30,882 51 |
| ..... | ..... | ..... | ..... | ..... | ..... | 3 | 1,146 | 535 14 |
| 3 | 545 | 2,104 11 | ..... | ..... | ..... | 7 | 1,523 | 3,184 14 |
| 180 | 600 | 23,009 87 | 83 | 400 | 9,291 74 | 536 | 1,671 | 62,544 44 |
| ..... | ..... | ..... | ..... | ..... | ..... | 77 | ..... | 2,310 00 |
| ..... | ..... | ..... | ..... | ..... | ..... | 5 | 182 | 287 91 |
| ..... | ..... | ..... | ..... | ..... | ..... | 1 | 1,474 | 678 29 |
| ..... | ..... | ..... | ..... | ..... | ..... | ..... | 529 | 52 98 |
| ..... | ..... | ..... | ..... | ..... | ..... | 1 | 200 | 319 81 |
| ..... | ..... | ..... | 5,457 | ..... | 105,147 61 | 11,162 | ..... | 279,229 04 |
| ..... | ..... | ..... | ..... | ..... | ..... | 2 | 622 | 67 55 |
| ..... | ..... | ..... | ..... | ..... | ..... | ..... | 569 | 204 10 |
| ..... | ..... | ..... | ..... | ..... | ..... | 13 | 1,322 | 4,066 90 |
| 4,029 | ..... | 124,684 20 | ..... | ..... | ..... | 11,379 | ..... | 363,275 42 |
| 324 | 97 | 22,267 06 | 311 | 1,998 | 18,688 80 | 960 | 95 | 38,175 01 |
| 51 | ..... | 1,701 76 | 55 | 1 | 2,417 12 | 106 | 1 | 4,118 88 |
| ..... | ..... | ..... | 52 | ..... | 3,016 00 | 52 | ..... | 3,016 00 |
| ..... | ..... | ..... | 78 | 1,630 | 4,991 35 | 78 | 1,630 | 4,991 35 |
| ..... | ..... | ..... | 28 | 348 | 3,080 11 | 28 | 348 | 3,080 11 |
| 105 | ..... | 1,793 03 | 272 | ..... | 4,950 40 | 377 | ..... | 6,743 43 |
| 4,701 | 1,697 | \$177,999 03 | 6,705 | 1,947 | \$180,518 35 | 25,897 | 163 | \$842,583 73 |

STOREY

| Name of Mine or Owner. | FIRST QUARTER. | | | SECOND QUARTER. | | |
|------------------------|----------------|---------|----------------|-----------------|---------|----------------|
| | Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. |
| Belcher | 7,325 | ..... | \$ 209,918 39 | 5,837 | ..... | \$ 134,752 60 |
| California | 45,208 | ..... | 4,992,874 75 | 49,967 | 100 | 4,627,456 25 |
| Chollar Potosi | 12,621 | ..... | 227,411 83 | 9,104 | ..... | 145,489 49 |
| Con. Virginia | 18,717 | 200 | 1,364,512 20 | 39,777 | 1,500 | 3,775,362 42 |
| Justice | 35,222 | 500 | 721,671 16 | 40,775 | 1,300 | 743,062 66 |
| Ophir | 1,460 | 1,500 | 27,216 56 | 2,660 | ..... | 78,473 93 |
| Trojan | 607 | 1,650 | 5,900 00 | ..... | ..... | ..... |
| Andes ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Empire ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Con. Imperial ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Crown Point ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Overman ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Tailings | 7,017 | ..... | 92,465 87 | 21,678 | ..... | 225,379 62 |
| Totals | 128178 | 1,850 | \$7,641,970 76 | 169799 | 900 | \$9,739,976 97 |

WHITE PINE

| Name of Mine or Owner. | FIRST QUARTER. | | | SECOND QUARTER. | | |
|------------------------------|----------------|---------|--------------|-----------------|---------|--------------|
| | Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. |
| Eberhardt & Ward Beecher .. | 855 | 523 | \$33,115 82 | ..... | ..... | ..... |
| Pacific | 499 | 1,480 | 3,796 70 | ..... | ..... | ..... |
| Paymaster | 220 | ..... | 8,000 00 | ..... | ..... | ..... |
| Queen | 5 | 794 | 1,243 71 | ..... | ..... | ..... |
| Silver Peak | 4 | 110 | 994 48 | ..... | ..... | ..... |
| Tea Cup | 62 | 1,440 | 6,938 30 | ..... | ..... | ..... |
| Battery ..... | ..... | ..... | ..... | 22 | 704 | \$2,685 71 |
| Exchequer ..... | ..... | ..... | ..... | 124 | ..... | 3,525 32 |
| Copper Silver Glance ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Eberhardt & Aurora ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Hunter Con. .... | ..... | ..... | ..... | ..... | ..... | ..... |
| Kate Alice ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Newark ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Prince ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Silver Wreath and Lookout .. | ..... | ..... | ..... | ..... | ..... | ..... |
| Stafford ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Tallahasse ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Totals | 1,597 | 347 | \$54,089 01 | 146 | 704 | \$6,211 03 |

COUNTY—1877.

| THIRD QUARTER. | | | FOURTH QUARTER. | | | TOTALS. | | |
|----------------|---------|----------------|-----------------|---------|----------------|---------|---------|-----------------|
| Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. |
| 2,685 | ..... | \$ 64,894 97 | 300 | ..... | \$ 4,575 65 | 16,147 | ..... | \$ 414,141 61 |
| 58,186 | 800 | 4,337,244 51 | 60,321 | 1,250 | 4,956,267 44 | 213,682 | 150 | 18,913,842 95 |
| 5,282 | ..... | 81,811 38 | 3,600 | ..... | 56,926 63 | 30,607 | ..... | 511,639 33 |
| 40,650 | 1,200 | 4,323,357 70 | 54,021 | ..... | 4,262,518 58 | 153,166 | 900 | 13,725,750 90 |
| 34,285 | ..... | 598,188 89 | 17,085 | 1,100 | 276,133 84 | 127,368 | 900 | 2,339,056 55 |
| 1,467 | ..... | 31,084 01 | 576 | 1,000 | 21,643 46 | 6,164 | 500 | 158,417 96 |
| ..... | ..... | ..... | 2,395 | ..... | 27,942 26 | 3,002 | 1,650 | 33,842 26 |
| 936 | ..... | 14,040 00 | ..... | ..... | ..... | 936 | ..... | 14,040 00 |
| 3,968 | ..... | 55,274 24 | ..... | ..... | ..... | 3,968 | ..... | 55,274 24 |
| ..... | ..... | ..... | 2,997 | ..... | 41,958 00 | 2,997 | ..... | 41,958 00 |
| ..... | ..... | ..... | 4,184 | 1,500 | 76,120 24 | 4,184 | 1,500 | 76,120 24 |
| ..... | ..... | ..... | 282 | 1,700 | 7,452 66 | 282 | 1,700 | 7,452 66 |
| 21,131 | 1,000 | 238,101 02 | 21,522 | ..... | 204,769 17 | 71,318 | 1,000 | 770,715 68 |
| 168,591 | 1,000 | \$9,743,996 72 | 167,286 | 550 | \$9,936,307 93 | 633,856 | 300 | \$37,062,252 38 |

COUNTY—1877.

| THIRD QUARTER. | | | FOURTH QUARTER. | | | TOTALS. | | |
|----------------|---------|--------------|-----------------|---------|--------------|---------|---------|--------------|
| Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. |
| 793 | 500 | \$17,190 00 | ..... | ..... | ..... | 855 | 523 | \$ 33,115 82 |
| 693 | ..... | 71,356 90 | 1,554 | ..... | \$114,435 43 | 1,242 | 1,980 | 20,986 70 |
| ..... | ..... | ..... | ..... | ..... | ..... | 2,467 | ..... | 193,792 33 |
| ..... | ..... | ..... | ..... | ..... | ..... | 5 | 794 | 1,243 71 |
| ..... | ..... | ..... | ..... | ..... | ..... | 4 | 110 | 991 48 |
| 170 | 250 | 13,292 50 | 414 | 500 | 14,445 87 | 647 | 190 | 34,676 67 |
| ..... | ..... | ..... | ..... | ..... | ..... | 22 | 704 | 2,685 71 |
| ..... | ..... | ..... | 32 | ..... | 1,120 00 | 156 | ..... | 4,645 32 |
| 10 | 540 | 406 67 | ..... | ..... | ..... | 10 | 540 | 406 67 |
| 392 | 974 | 13,109 28 | 228 | 887 | 7,869 66 | 620 | 1,861 | 20,978 94 |
| ..... | ..... | ..... | 1,231 | 1,624 | 62,795 09 | 1,231 | 1,624 | 62,795 09 |
| 185 | ..... | 1,665 00 | ..... | ..... | ..... | 185 | ..... | 1,665 00 |
| 6 | 1,407 | 921 95 | ..... | ..... | ..... | 6 | 1,407 | 921 95 |
| 8 | 1,830 | 1,120 44 | 29 | 1,500 | 1,472 03 | 38 | 1,330 | 2,592 47 |
| ..... | ..... | ..... | 1 | 500 | 1,143 58 | 1 | 500 | 1,143 58 |
| 706 | ..... | 24,826 80 | ..... | ..... | ..... | 706 | ..... | 24,926 80 |
| 13 | 1,911 | 920 28 | ..... | ..... | ..... | 13 | 1,911 | 920 28 |
| 2,979 | 1,412 | \$144,409 82 | 3,491 | 1,011 | \$203,281 66 | 8,214 | 1,474 | \$408,491 52 |

ELKO

| Name of Mine or Owner. | FIRST QUARTER. | | |
|------------------------|----------------|---------|--------------|
| | Tons. | Pounds. | Gross Value. |
| Grand Prize..... | 2,662 | ..... | \$424,599 90 |
| Defrees..... | ..... | ..... | ..... |
| Hussey..... | ..... | ..... | ..... |
| Independence..... | ..... | ..... | ..... |
| Cornucopia..... | ..... | ..... | ..... |
| Totals..... | 2,662 | ..... | \$424,599 90 |

ESMERALDA

| Name of Mine or Owner. | FIRST QUARTER. | | |
|----------------------------------|----------------|---------|--------------|
| | Tons. | Pounds. | Gross Value. |
| Douglas, H. C..... | 40 | ..... | \$ 1,025 85 |
| Grundy & Spence..... | 134 | ..... | 4,700 00 |
| Millsap, R. W..... | 40 | ..... | 1,000 00 |
| Robinson, A. D..... | 19 | ..... | 786 00 |
| Vanderbildt & Pocotillo..... | 270 | 1,098 | 18,240 58 |
| White & Ross..... | 34 | ..... | 518 00 |
| Atwood, Geo..... | ..... | ..... | ..... |
| Black Warrior & Vanderbildt..... | ..... | ..... | ..... |
| Callison..... | ..... | ..... | ..... |
| Dolores..... | ..... | ..... | ..... |
| Northern Belle..... | ..... | ..... | ..... |
| Alida..... | ..... | ..... | ..... |
| Endowment..... | ..... | ..... | ..... |
| Thos. McMasters..... | ..... | ..... | ..... |
| Wasson..... | ..... | ..... | ..... |
| Wheeler..... | ..... | ..... | ..... |
| Totals..... | 537 | 1,098 | \$26,270 43 |

COUNTY—1878.

| SECOND QUARTER. | | | THIRD QUARTER. | | | TOTALS. | | |
|-----------------|---------|--------------|----------------|---------|--------------|---------|---------|--------------|
| Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. |
| 1,478 | | \$152,544 27 | ..... | ..... | ..... | 4,140 | ..... | \$577,144 17 |
| 295 | | 21,722 11 | ..... | ..... | ..... | 295 | ..... | 21,722 11 |
| 833 | | 39,898 22 | ..... | ..... | ..... | 833 | ..... | 39,998 22 |
| 1,690 | | 103,049 80 | 1,650 | ..... | \$130,475 64 | 3,340 | ..... | 233,525 44 |
| | | | 1,495 | 975 | 69,529 00 | 1,495 | 975 | 69,529 00 |
| 4,290 | | \$317,314 40 | 3,145 | 975 | \$200,004 64 | 10,103 | 975 | \$941,918 94 |

COUNTY—1878.

| SECOND QUARTER. | | | THIRD QUARTER. | | | TOTALS. | | |
|-----------------|---------|--------------|----------------|---------|--------------|---------|---------|--------------|
| Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. |
| | | | | | | 40 | ..... | \$ 1,025 85 |
| | | | | | | 134 | ..... | 4,700 00 |
| | | | | | | 40 | ..... | 1,000 00 |
| | | | | | | 19 | ..... | 786 00 |
| | | | | | | 270 | 1,098 | 18,240 85 |
| | | | | | | 34 | ..... | 518 00 |
| 1 | 462 | \$138 28 | ..... | ..... | ..... | 1 | 462 | 133 28 |
| 167 | 1,363 | 8,088 84 | 430 | 600 | \$33,441 28 | 597 | 1,963 | 41,530 12 |
| 724 | | 62,663 40 | ..... | ..... | ..... | 724 | ..... | 62,663 40 |
| 525 | | 8,600 00 | ..... | ..... | ..... | 525 | ..... | 8,600 00 |
| 2,207 | | 97,753 16 | 4,258 | ..... | 138,620 10 | 6,465 | ..... | 236,373 26 |
| | | | 257 | ..... | 8,738 00 | 257 | ..... | 8,738 00 |
| | | | 224 | 943 | 10 358 68 | 224 | 943 | 10,356 68 |
| | | | 204 | 777 | 21,166 72 | 204 | 777 | 21,166 72 |
| | | | 166 | 600 | 15,132 34 | 166 | 600 | 15,132 34 |
| | | | 1,495 | ..... | 38,810 90 | ..... | ..... | ..... |
| 3,624 | 1,825 | \$177,238 68 | 7,035 | 900 | \$266,266 02 | 11,197 | 1,823 | \$469,775 13 |

EUREKA

| Name of Mine or Owner. | FIRST QUARTER. | | |
|-------------------------|----------------|---------|--------------|
| | Tons. | Pounds. | Gross Value. |
| Barton..... | 128 | 170 | \$ 4,334 71 |
| Bullwhacker..... | 49 | 550 | 1,538 90 |
| Connelly..... | 495 | 1,696 | 24,001 39 |
| Eureka Con..... | 17 | 8 | 753,895 59 |
| Eagle..... | 24 | 420 | 2,655 11 |
| El Dorado..... | 8 | 1,151 | 614 72 |
| Garrison..... | 74 | ..... | 21,463 20 |
| Industry..... | 59 | 1,800 | 4,766 81 |
| Jackson..... | 123 | 1,085 | 3,117 22 |
| K. K. Con..... | 2,724 | 365 | 74,211 74 |
| Lemon..... | 17 | 858 | 961 54 |
| General Lee..... | 10 | 1,791 | 814 28 |
| Macon City..... | 5 | 1,390 | 358 91 |
| Mortimer..... | 28 | 1,650 | 1,499 18 |
| Mountain Boy..... | 10 | 1,914 | 1,429 32 |
| Richmond Con..... | 13,137 | 790 | 775,020 83 |
| Silver Corner..... | 27 | 44 | 1,341 24 |
| Silver West..... | 10 | 1,175 | 509 57 |
| Silver Lick..... | 13 | 650 | 575 39 |
| Williams..... | 19 | 1,367 | 1,491 99 |
| Atlas..... | ..... | ..... | ..... |
| Bald Eagle..... | ..... | ..... | ..... |
| Dog Star..... | ..... | ..... | ..... |
| Empire..... | ..... | ..... | ..... |
| Grant..... | ..... | ..... | ..... |
| Geddes & Bertrandt..... | ..... | ..... | ..... |
| Golden Era..... | ..... | ..... | ..... |
| Hamburg..... | ..... | ..... | ..... |
| Hoosac..... | ..... | ..... | ..... |
| John Bull..... | ..... | ..... | ..... |
| Orange..... | ..... | ..... | ..... |
| Phoenix..... | ..... | ..... | ..... |
| Pleades..... | ..... | ..... | ..... |
| Pioneer..... | ..... | ..... | ..... |
| Snell..... | ..... | ..... | ..... |
| Sterling..... | ..... | ..... | ..... |
| Tallahassee..... | ..... | ..... | ..... |
| Union..... | ..... | ..... | ..... |
| War Eagle..... | ..... | ..... | ..... |
| Wide West..... | ..... | ..... | ..... |
| Williamsburg..... | ..... | ..... | ..... |
| Other mines..... | 1 | 320 | 133 41 |
| Alexandria..... | ..... | ..... | ..... |
| Banner..... | ..... | ..... | ..... |
| Blackburn..... | ..... | ..... | ..... |
| Cloud..... | ..... | ..... | ..... |

COUNTY—1878.

| SECOND QUARTER. | | | THIRD QUARTER. | | | TOTALS. | | |
|-----------------|---------|--------------|----------------|---------|--------------|---------|---------|--------------|
| Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. |
| 105 | 1,220 | \$ 829 29 | ..... | ..... | ..... | 233 | 1,390 | \$ 5,164 00 |
| 47 | 250 | 2,519 52 | 33 | 490 | \$ 2,116 06 | 129 | 1,290 | 6,174 48 |
| 636 | 1,405 | 29,483 47 | 302 | 172 | 10,646 38 | 1,434 | 273 | 64,131 24 |
| 18 | 350 | 771,243 31 | 19,045 | ..... | 770,205 16 | 19,080 | 358 | 2,295,344 06 |
| ..... | ..... | ..... | ..... | ..... | ..... | 24 | 420 | 2,655 11 |
| 145 | 293 | 26,494 01 | 46 | 540 | 4,227 91 | 199 | 1,984 | 31,336 64 |
| 105 | ..... | 11,436 87 | 227 | 1,246 | 25,337 24 | 406 | 1,246 | 58,237 31 |
| 25 | 524 | 2,353 07 | ..... | ..... | ..... | 85 | 324 | 7,119 88 |
| 17 | 1,168 | 1,171 09 | 17 | 1,550 | 774 36 | 158 | 1,803 | 5,062 67 |
| 3,313 | 140 | 91,320 07 | ..... | ..... | ..... | 6,037 | 505 | 165,531 81 |
| 19 | 612 | 761 51 | ..... | ..... | ..... | 36 | 1,470 | 1,723 05 |
| 30 | 1,931 | 867 39 | 2 | 1,370 | 209 94 | 44 | 1,092 | 1,891 61 |
| 27 | 562 | 1,767 59 | ..... | ..... | ..... | 32 | 1,952 | 2,126 50 |
| ..... | ..... | ..... | ..... | ..... | ..... | 28 | 1,650 | 1,499 18 |
| 24 | 15 | 3,257 27 | 9 | 417 | 1,792 19 | 44 | 346 | 6,478 78 |
| 12,357 | 1,090 | 632,221 88 | 7,677 | 718 | 315,446 63 | 33,172 | 598 | 1,722,689 34 |
| 14 | 1,603 | 661 01 | 40 | 1,033 | 2,011 82 | 82 | 680 | 4,014 07 |
| ..... | ..... | ..... | ..... | ..... | ..... | 10 | 1,175 | 509 57 |
| 62 | 467 | 4,993 82 | 15 | 1,048 | 964 43 | 91 | 165 | 6,533 64 |
| 20 | 144 | 1,332 77 | 40 | 296 | 5,920 00 | 79 | 1,807 | 8,744 76 |
| 66 | 1,562 | 4,881 51 | ..... | ..... | ..... | 66 | 1,562 | 4,881 51 |
| 31 | 1,979 | 3,503 67 | 19 | 1,480 | 1,852 85 | 51 | 1,450 | 5,356 52 |
| 12 | 800 | 1,390 66 | ..... | ..... | ..... | 12 | 800 | 1,390 66 |
| 6 | 1,880 | 592 63 | ..... | ..... | ..... | 6 | 1,880 | 592 63 |
| 33 | 513 | 1,690 70 | 28 | 563 | 1,543 33 | 61 | 1,076 | 3,234 03 |
| 70 | 848 | 4,715 85 | 21 | 1,063 | 1,062 01 | 91 | 1,911 | 5,777 86 |
| 3 | 1,340 | 96 92 | ..... | ..... | ..... | 3 | 1,340 | 96 92 |
| 313 | 380 | 13,060 00 | ..... | ..... | ..... | 313 | 380 | 13,060 00 |
| 119 | 1,386 | 5,645 10 | 7 | 1,620 | 327 08 | 127 | 1,006 | 5,973 18 |
| 6 | 916 | 241 91 | ..... | ..... | ..... | 6 | 916 | 241 91 |
| 6 | 1,043 | 194 89 | ..... | ..... | ..... | 6 | 1,043 | 194 89 |
| 567 | 1,960 | 14,154 19 | ..... | ..... | ..... | 567 | 1,960 | 14,154 19 |
| 39 | 1,920 | 1,086 49 | ..... | ..... | ..... | 39 | 1,920 | 1,086 49 |
| 2 | 548 | 122 69 | ..... | ..... | ..... | 2 | 548 | 122 69 |
| 14 | 30 | 485 52 | ..... | ..... | ..... | 14 | 30 | 485 52 |
| 10 | 1,509 | 800 06 | ..... | ..... | ..... | 10 | 1,569 | 800 06 |
| 3 | 184 | 160 78 | ..... | ..... | ..... | 3 | 184 | 160 78 |
| 3 | 669 | 33 00 | ..... | ..... | ..... | 3 | 669 | 33 00 |
| 39 | 1,544 | 1,448 10 | ..... | ..... | ..... | 39 | 1,544 | 1,448 10 |
| 8 | 1,970 | 720 02 | 1 | 1,720 | 104 16 | 10 | 1,690 | 824 18 |
| 83 | 515 | 2,482 06 | 20 | 1,871 | 352 23 | 104 | 386 | 2,834 29 |
| 10 | 1,584 | 1,057 33 | ..... | ..... | ..... | 11 | 1,904 | 1,190 74 |
| ..... | ..... | ..... | 66 | 915 | 6,125 00 | 66 | 915 | 6,125 00 |
| ..... | ..... | ..... | 68 | 1,135 | 5,907 66 | 68 | 1,135 | 5,907 66 |
| ..... | ..... | ..... | 2 | 231 | 184 01 | 2 | 231 | 184 01 |
| ..... | ..... | ..... | 2 | 1,264 | 167 52 | 2 | 1,264 | 167 52 |

EUREKA

| Name of Mine or Owner. | FIRST QUARTER. | | |
|------------------------|----------------|---------|----------------|
| | Tons. | Pounds. | Gross Value. |
| Elise | | | |
| Fourth of July | | | |
| Inca | | | |
| San Jose | | | |
| Valentine | | | |
| Winall | | | |
| Morning Star | | | |
| Totals | 33,983 | 1,198 | \$1,674,735 05 |

LANDER

| Name of Mine or Owner. | FIRST QUARTER. | | |
|--------------------------|----------------|---------|--------------|
| | Tons. | Pounds. | Gross Value. |
| Cooper, H. H. | 10 | 142 | \$ 1,782 70 |
| Detroit. | 22 | 1,694 | 10,132 95 |
| Dreaper, Geo. | | 336 | 384 97 |
| Esther. | 12 | 1,290 | 4,026 37 |
| Grove. | | 1,100 | 869 87 |
| Homestake. | 12 | 1,376 | 2,668 16 |
| Lee, Thos. | 5 | 190 | 919 60 |
| Morris & Cable. | 1 | 422 | 731 67 |
| Manhattan. | 1,413 | 1,000 | 107,845 94 |
| Eclipse. | | | |
| General Thomas. | | | |
| McFee, John. | | | |
| Mullen, Geo. | | | |
| Patriot. | | | |
| Trask. | | | |
| Ward, Thos. | | | |
| McFanahan & Co. | | | |
| Wallace, James. | | | |
| Warren & Co. No. 2. | | | |
| Totals | 1,478 | 1,550 | \$129,362 23 |

COUNTY—Continued—1878.

| SECOND QUARTER. | | | THIRD QUARTER. | | | TOTALS. | | |
|-----------------|---------|----------------|----------------|---------|----------------|---------|---------|----------------|
| Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. |
| | | | 18 | 799 | \$ 703 47 | 18 | 799 | \$ 703 47 |
| | | | 76 | 1,387 | 2,420 14 | 76 | 1,387 | 2,420 14 |
| | | | 2 | 012 | 110 54 | 2 | 012 | 110 54 |
| | | | 8 | 1,768 | 552 83 | 8 | 1,768 | 552 83 |
| | | | 11 | 907 | 512 06 | 11 | 907 | 512 06 |
| | | | 3 | 1,950 | 268 20 | 3 | 1,950 | 268 20 |
| | | | 3 | 1,214 | 198 02 | 3 | 1,214 | 198 02 |
| 36,761 | 1,647 | \$1,641,378 03 | 28,514 | 1,019 | \$1,187,154 86 | 99,259 | 1,864 | \$4,503,267 94 |

COUNTY—1878.

| SECOND QUARTER. | | | THIRD QUARTER. | | | TOTALS. | | |
|-----------------|---------|--------------|----------------|---------|--------------|---------|---------|--------------|
| Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. |
| 9 | 1,420 | \$ 872 98 | 2 | 626 | \$554 18 | 22 | 188 | \$ 3,209 86 |
| ..... | ..... | ..... | ..... | ..... | ..... | 22 | 1,694 | 10,132 95 |
| ..... | ..... | ..... | ..... | ..... | ..... | ..... | 336 | 384 97 |
| ..... | ..... | ..... | ..... | ..... | ..... | 12 | 1,290 | 4,026 37 |
| ..... | ..... | ..... | 681 | ..... | 34,650 77 | 681 | 1,100 | 35,520 64 |
| 16 | 1,782 | 3,597 12 | ..... | ..... | ..... | 29 | 1,158 | 6,265 28 |
| 4 | 1,144 | 854 52 | ..... | ..... | ..... | 9 | 1,334 | 1,774 12 |
| ..... | ..... | ..... | ..... | ..... | ..... | 1 | 422 | 731 67 |
| 1,327 | 1,250 | 110,996 06 | 1,249 | 250 | 153,243 00 | 3,990 | 500 | 372,085 00 |
| 65 | 88 | 10,048 79 | ..... | ..... | ..... | 65 | 88 | 10,048 79 |
| 7 | 300 | 1,392 32 | ..... | ..... | ..... | 7 | 300 | 1,392 32 |
| 10 | 1,920 | 7,640 88 | 9 | 420 | 4,500 84 | 20 | 340 | 12,141 72 |
| 5 | 256 | 1,541 78 | 5 | 256 | 1,441 78 | 10 | 512 | 3,083 56 |
| 15 | 300 | 4,454 43 | ..... | ..... | ..... | 15 | 300 | 4,454 43 |
| ..... | 500 | 412 83 | ..... | ..... | ..... | ..... | 500 | 412 83 |
| 38 | 862 | 13,974 86 | 31 | 1,980 | 13,673 00 | 70 | 842 | 27,647 86 |
| ..... | ..... | ..... | 4 | 280 | 1,157 54 | 4 | 280 | 1,157 54 |
| ..... | ..... | ..... | 1 | 452 | 930 00 | 1 | 452 | 930 00 |
| ..... | ..... | ..... | 10 | 70 | 5,382 02 | 10 | 70 | 5,382 02 |
| 1,500 | 1,822 | \$155,786 57 | 1,994 | 334 | \$215,633 13 | 4,973 | 1,706 | \$500,782 03 |

HUMBOLDT

| Name of Mine or Owner. | FIRST QUARTER. | | |
|---------------------------|----------------|---------|--------------|
| | Tons. | Pounds. | Gross Value. |
| Arizona S. M. Co..... | 340 | ..... | \$ 7,310 00 |
| Rye Patch M. & M. Co..... | 921 | ..... | 32,018 94 |
| Tailings..... | 4,400 | ..... | 21,537 50 |
| Tailings (Arizona)..... |  | ..... |  |
| Totals..... | 5,661 | ..... | \$60,866 44 |

LINCOLN

| Name of Mine or Owner. | FIRST QUARTER. | | |
|----------------------------------|----------------|---------|--------------|
| | Tons. | Pounds. | Gross Value. |
| Alps | 649 | 470 | \$29,772 11 |
| Bonanza | 2 | 79 | 442 46 |
| Blue Bell | 80 | ..... | 2,400 00 |
| Desdemona | 15 | 130 | 961 23 |
| Day | 888 | 320 | 51,735 42 |
| Meadow Valley | 161 | 20 | 16,690 32 |
| Nevada | 10 | 120 | 716 48 |
| Newark | 79 | 120 | 2,869 45 |
| Pioche..... | 8 | 340 | 764 00 |
| Raymond & Ely | 20 | 1,252 | 3,114 43 |
| Sunbeam | 8 | 1,760 | 923 68 |
| Washington & Creole | 41 | 1,220 | 4,823 96 |
| Chance | | | |
| Clymer | | | |
| Hillside | | | |
| Mayflower | | | |
| Techatticup | | | |
| Inca..... | | | |
| Inca (ore sold)..... | | | |
| Mazeppa..... | | | |
| Raymond & Ely (chloriders) | | | |
| <i>Tailings.</i> | | | |
| Meadow Valley | | | |
| Raymond & Ely | | | |
| Totals..... | 6,286 | 1,831 | \$143,678 16 |

COUNTY—1878.

| SECOND QUARTER. | | | THIRD QUARTER. | | | TOTALS. | | |
|-----------------|---------|--------------|----------------|---------|--------------|---------|---------|--------------|
| Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. |
| 937 | ..... | \$19,208 00 | 960 | ..... | \$16,321 00 | 2,237 | ..... | \$42,839 00 |
| 1,181 | 1,000 | 32,352 65 | 224 | 800 | 5,955 00 | 1,405 | 1,800 | 70,326 59 |
| 4,675 | ..... | 24,600 00 | ..... | ..... | ..... | 9,075 | ..... | 46,137 50 |
| ..... | ..... | ..... | 4,300 | ..... | 17,100 00 | 4,300 | ..... | 17,100 00 |
| 6,793 | 1,000 | \$76,160 65 | 5,484 | 800 | \$39,376 00 | 17,938 | 1,800 | \$176,403 09 |

COUNTY—1878.

| SECOND QUARTER. | | | THIRD QUARTER. | | | TOTALS. | | |
|-----------------|---------|--------------|----------------|---------|--------------|---------|---------|--------------|
| Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. |
| 77 | ..... | \$ 2,380 18 | ..... | ..... | ..... | 726 | 470 | \$32,172 29 |
| ..... | ..... | ..... | ..... | ..... | ..... | 2 | 79 | 442 46 |
| ..... | ..... | ..... | ..... | ..... | ..... | 80 | ..... | 2,400 00 |
| 8 | 910 | 258 06 | ..... | ..... | ..... | 23 | 1,040 | 1,217 29 |
| 195 | 1,155 | 4,063 03 | ..... | ..... | ..... | 1,083 | 1,475 | 55,798 46 |
| 421 | 560 | 17,851 11 | 1,049 | 1,692 | 22,046 76 | 1,632 | 272 | 56,588 19 |
| ..... | ..... | ..... | ..... | ..... | ..... | 10 | 120 | 716 48 |
| ..... | ..... | ..... | ..... | ..... | ..... | 79 | 120 | 2,869 45 |
| ..... | ..... | ..... | ..... | ..... | ..... | 8 | 340 | 764 00 |
| 1,127 | 1,122 | 29,594 45 | 561 | ..... | 23,734 86 | 1,709 | 374 | 56,443 74 |
| 4 | 100 | 411 19 | ..... | ..... | ..... | 12 | 1,860 | 1,334 87 |
| 22 | 1,600 | 1,673 82 | ..... | ..... | ..... | 64 | 820 | 6,497 78 |
| 6 | 1,400 | 1,829 53 | ..... | ..... | ..... | 6 | 1,400 | 1,829 55 |
| 5 | 910 | 1,013 15 | ..... | ..... | ..... | 5 | 910 | 1,013 15 |
| 150 | ..... | 7,899 83 | 384 | ..... | 15,581 25 | 534 | ..... | 23,481 08 |
| 80 | 1,284 | 1,538 64 | ..... | ..... | ..... | 80 | 1,284 | 1,538 64 |
| 220 | ..... | 15,827 25 | 328 | ..... | 22,931 42 | 548 | ..... | 38,758 67 |
| ..... | ..... | ..... | 25 | 1,692 | 4,808 84 | 25 | 1,692 | 4,808 84 |
| ..... | ..... | ..... | 3 | 1,547 | 1,167 66 | 3 | 1,547 | 1,167 66 |
| ..... | ..... | ..... | 15 | 1,190 | 627 80 | 15 | 1,190 | 627 80 |
| ..... | ..... | ..... | 389 | ..... | 30,089 15 | 389 | ..... | 30,089 15 |
| ..... | ..... | ..... | 2,501 | ..... | 22,727 53 | 2,501 | ..... | 22,727 53 |
| ..... | ..... | ..... | 6,921 | ..... | 34,071 66 | 6,921 | ..... | 34,071 66 |
| 8,303 | 641 | \$139,059 29 | 12,159 | 121 | \$177,786 93 | 26,749 | 593 | \$460,524 38 |

LYON

| Name of Mine or Owner. | FIRST QUARTER. | | |
|------------------------------------|----------------|---------|--------------|
| | Tons. | Pounds. | Gross Value. |
| <i>Tailings.</i> | | | |
| Bacon Mill..... | 340 | | \$10,685 16 |
| French's Mill..... | 200 | | 1,500 00 |
| Lyon M. & M. Co..... | 10,742 | | 44,833 16 |
| Trench Mill..... | 582 | | 13,865 82 |
| Wordworth Mill..... | 5,946 | | 44,348 16 |
| Pacific Mill Co..... | | | |
| Union M. & M. Co..... | | | |
| Pacific Mill Co., French Mill..... | | | |
| Excelsior Mill..... | | | |
| Totals..... | 17,810 | | \$115,232 30 |

NYE

| Name of Mine or Owner. | FIRST QUARTER. | | |
|--------------------------|----------------|---------|--------------|
| | Tons. | Pounds. | Gross Value. |
| Alexander Mining Co..... | 753 | 555 | \$29,687 07 |
| Downey & Co..... | 53 | | 4,028 00 |
| Illinois..... | 160 | 884 | 15,047 69 |
| Tybo Con..... | 5,639 | | 182,051 72 |
| Ural S. M. Co..... | 507 | 1,000 | 23,359 89 |
| Argent..... | | | |
| Gila..... | | | |
| Totals..... | 7,133 | 439 | \$254,174 37 |

ORMSBY

| Name of Mine or Owner. | FIRST QUARTER. | | |
|--|----------------|---------|--------------|
| | Tons. | Pounds. | Gross Value. |
| Tailings Pacific Mill & Mining Co..... | | | |
| Totals..... | | | |

COUNTY—1878.

| SECOND QUARTER. | | | THIRD QUARTER. | | | TOTALS. | | |
|-----------------|---------|--------------|----------------|---------|--------------|---------|---------|--------------|
| Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. |
| 210 | | \$ 5,224 30 | ..... | ..... | ..... | 550 | ..... | \$ 15,909 46 |
| 13,525 | | 50,231 81 | 11,882 | ..... | \$49,669 83 | 200 | ..... | 1,500 00 |
| 337 | | 8,054 20 | ..... | ..... | ..... | 36,149 | ..... | 144,734 80 |
| 5,644 | | 80,311 78 | ..... | ..... | ..... | 919 | ..... | 21,920 02 |
| 7,000 | | 70,000 00 | ..... | ..... | ..... | 11,590 | ..... | 124,659 94 |
| 9,700 | | 38,765 08 | 9,900 | ..... | 40,761 14 | 7,000 | ..... | 70,000 00 |
| | | | 365 | ..... | 8,443 00 | 19,600 | ..... | 79,526 22 |
| | | | 1,735 | ..... | 4,950 00 | 365 | ..... | 8,443 00 |
| | | | | | | 1,735 | ..... | 4,950 00 |
| 36,416 | | \$252,587 17 | 23,882 | ..... | \$103,823 97 | 78,108 | ..... | \$471,643 44 |

COUNTY—1878.

| SECOND QUARTER. | | | THIRD QUARTER. | | | TOTALS. | | |
|-----------------|---------|--------------|----------------|---------|--------------|---------|---------|--------------|
| Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. |
| 1,281 | 1,272 | \$ 42,412 68 | 700 | ..... | \$ 42,000 00 | 2,754 | 1,827 | \$114,099 75 |
| ..... | ..... | ..... | 1,000 | ..... | 35,000 00 | 1,053 | ..... | 39,028 00 |
| ..... | ..... | ..... | 881 | 400 | 65,297 64 | 1,041 | 1,284 | 80,345 33 |
| 5,318 | ..... | 139,284 43 | 4,649 | ..... | 126,444 00 | 15,606 | ..... | 447,780 15 |
| ..... | ..... | ..... | ..... | ..... | ..... | 507 | 1,000 | 23,359 89 |
| 421 | 340 | 38,437 30 | ..... | ..... | ..... | 421 | 340 | 38,437 30 |
| 404 | 690 | 18,464 12 | 100 | 603 | 8,573 64 | 504 | 1,293 | 27,037 76 |
| 7,425 | 302 | \$238,598 53 | 7,330 | 1,003 | \$277,315 28 | 21,888 | 1,744 | \$770,088 18 |

COUNTY—1878.

| SECOND QUARTER. | | | THIRD QUARTER. | | | TOTALS. | | |
|-----------------|---------|--------------|----------------|---------|--------------|---------|---------|--------------|
| Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. |
| | | | 4,875 | ..... | \$53,665 86 | 4,875 | ..... | \$53,665 86 |
| | | | 4,875 | ..... | \$53,665 86 | 4,875 | ..... | \$53,665 86 |

STOREY

| Name of Mine or Owner. | FIRST QUARTER. | | |
|-----------------------------|----------------|---------|-----------------|
| | Tons. | Pounds. | Gross Value. |
| Con. Virginia..... | 59,714 | 700 | \$4,731,845 44 |
| California..... | 53,330 | 900 | 5,316,655 15 |
| Chollar-Potosi..... | 2,824 | | 48,767 18 |
| Con. Imperial..... | 3,483 | | 43,965 33 |
| Crown Point..... | 3,644 | 950 | 57,380 52 |
| Justice..... | 6,306 | | 122,342 74 |
| Ophir..... | 88 | | 10,645 36 |
| Trojan..... | 4,411 | | 27,306 07 |
| Andes..... | | | |
| Tailings..... | 18,991 | | 184,933 53 |
| Tailings, Express Mill..... | | | |
| Tailings, Mariposa..... | | | |
| Tailings, Omega..... | | | |
| Totals..... | 152,792 | 550 | \$10,543,841 32 |

WHITE PINE

| Name of Mine or Owner. | FIRST QUARTER. | | |
|---------------------------|----------------|---------|--------------|
| | Tons. | Pounds. | Gross Value. |
| Crescent..... | 18 | | \$ 631 50 |
| Oseola..... | 6 | 1,000 | 266 25 |
| Paymaster..... | 1,213 | 1,541 | 71,283 57 |
| Queen..... | 12 | 43 | 3,238 59 |
| Star..... | 1,463 | | 81,110 63 |
| Teacup..... | 70 | | 5,940 00 |
| Eagle and Crescent..... | | | |
| Twin..... | | | |
| Eberhardt and Aurora..... | | | |
| Lookout..... | | | |
| Stafford..... | | | |
| Totals..... | 2,783 | 584 | \$162,470 54 |

COUNTY—1878.

| SECOND QUARTER. | | | THIRD QUARTER. | | | TOTALS. | | |
|-----------------|---------|----------------|----------------|---------|-----------------|---------|---------|-----------------|
| Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. |
| 36,500 | 1,000 | \$2,143,450 88 | 17,620 | 300 | \$715,355 26 | 113735 | ..... | \$7,590,657 58 |
| 35,356 | 535 | 3,029,893 22 | 20,172 | 1,723 | 895,628 74 | 108859 | 1,158 | 8,242,177 11 |
| 3,281 | ..... | 37,767 50 | 3,680 | ..... | 51,691 60 | 2,824 | ..... | 48,767 18 |
| 5,176 | ..... | 106,128 46 | ..... | ..... | ..... | 10,453 | ..... | 133,424 43 |
| 353 | 450 | 38,053 30 | ..... | ..... | ..... | 3,644 | 950 | 57,380 52 |
| 943 | 1,000 | 15,665 73 | 544 | 1,200 | 8,738 46 | 11,482 | ..... | 228,471 20 |
| ..... | ..... | ..... | 720 | ..... | 12,240 00 | 441 | 450 | 48,698 66 |
| ..... | ..... | ..... | ..... | ..... | ..... | 5,899 | 200 | 51,710 26 |
| ..... | ..... | ..... | ..... | ..... | ..... | 720 | ..... | 12,240 00 |
| 21,919 | ..... | 183,236 73 | ..... | ..... | ..... | 40,910 | ..... | 368,170 26 |
| ..... | ..... | ..... | 1,105 | ..... | 9,968 45 | 1,105 | ..... | 9,968 45 |
| ..... | ..... | ..... | 4,112 | ..... | 56,772 11 | 4,112 | ..... | 56,772 11 |
| ..... | ..... | ..... | 16,291 | ..... | 141,198 52 | 16,291 | ..... | 141,198 52 |
| 103429 | 985 | \$5,554,201 82 | 64,254 | 1,223 | \$1,891,593 143 | 20,476 | 758 | \$17,989,636 28 |

COUNTY—1878.

| SECOND QUARTER. | | | THIRD QUARTER. | | | TOTALS. | | |
|-----------------|---------|--------------|----------------|---------|--------------|---------|---------|--------------|
| Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. | Tons. | Pounds. | Gross Value. |
| ..... | ..... | ..... | ..... | ..... | ..... | 18 | ..... | \$ 631 50 |
| ..... | ..... | ..... | ..... | ..... | ..... | 6 | 1,000 | 266 25 |
| 992 | ..... | \$62,409 80 | ..... | ..... | ..... | 2,205 | 1,541 | 133,693 37 |
| 23 | 1,608 | 4,618 12 | ..... | ..... | ..... | 35 | 1,651 | 7,856 71 |
| 1,108 | 1,000 | 77,872 12 | 1,203 | 1,500 | \$83,022 63 | 3,775 | 500 | 242,005 38 |
| ..... | ..... | ..... | ..... | ..... | ..... | 70 | ..... | 5,940 00 |
| 479 | 1,336 | 4,152 61 | 313 | 1,000 | 3,024 72 | 793 | 336 | 7,177 33 |
| 3 | 312 | 473 47 | ..... | ..... | ..... | 3 | 312 | 473 47 |
| ..... | ..... | ..... | 2,418 | 292 | 41,470 78 | 2,418 | 292 | 41,470 78 |
| ..... | ..... | ..... | 55 | ..... | 5,277 13 | 55 | ..... | 5,277 13 |
| ..... | ..... | ..... | 11 | 1,549 | 1,661 79 | 11 | 1,549 | 1,661 79 |
| 2,607 | 256 | \$149,526 12 | 4,002 | 341 | \$134,457 05 | 9,392 | 1,181 | \$446,453 71 |

SUMMARY.

| COUNTIES. | 1871. | | |
|-----------------|---------|---------|-----------------|
| | Tons. | Pounds. | Amount. |
| Elko..... | 5,904 | 1,000 | \$ 614,947 27 |
| Esmeralda..... | 3,028 | 910 | 137,079 29 |
| Humboldt..... | 21,168 | 195 | 529,958 38 |
| Lander..... | 35,995 | 815 | 2,099,013 91 |
| Lincoln..... | 33,678 | 1,934 | 3,604,833 47 |
| Lyon..... | 153,330 | 1,500 | 691,602 40 |
| Nye..... | 3,687 | 640 | 464,770 27 |
| Storey..... | 444,552 | 1,858 | 10,644,704 03 |
| Washoe..... | | | |
| White Pine..... | 44,235 | 1,749 | 1,223,266 10 |
| Totals..... | 747,582 | 601 | \$20,010,175 12 |

| COUNTIES. | 1872. | | |
|-----------------|---------|---------|-----------------|
| | Tons. | Pounds. | Amount. |
| Elko..... | 10,698 | 1,000 | \$ 493,369 76 |
| Esmeralda..... | 3,866 | 466 | 115,222 61 |
| Humboldt..... | 22,279 | 169 | 481,488 47 |
| Lander..... | 59,160 | 457 | 2,760,087 01 |
| Lincoln..... | 55,100 | 183 | 5,466,340 57 |
| Lyon..... | 239,905 | | 695,502 64 |
| Nye..... | 2,811 | 780 | 387,394 53 |
| Storey..... | 422,968 | 990 | 12,630,675 15 |
| Washoe..... | 10,052 | | 53,661 05 |
| White Pine..... | 27,516 | 401 | 738,498 08 |
| Totals..... | 854,457 | 446 | \$24,722,249 87 |

SUMMARY—Continued.

| COUNTIES. | 1873. | | |
|-----------------|---------|---------|-----------------|
| | Tons. | Pounds. | Amount. |
| Elko..... | 7,596 | ..... | \$ 262,968 68 |
| Esmeralda..... | 4,935 | 1,618 | 324,591 63 |
| Eureka..... | 70,724 | 518 | 2,677,226 80 |
| Humboldt..... | 19,828 | 500 | 342,193 86 |
| Lander..... | 5,200 | 199 | 743,368 21 |
| Lincoln..... | 68,234 | 1,279 | 3,741,497 64 |
| Lyon..... | 148,738 | 1,600 | 703,899 55 |
| Nye..... | 11,879 | 1,833 | 758,756 89 |
| Storey..... | 486,589 | 970 | 21,940,123 96 |
| Washoe..... | 13,618 | ..... | 68,353 71 |
| White Pine..... | 19,439 | 1,509 | 494,596 85 |
| Totals..... | 856,785 | 26 | \$32,057,577 78 |

| COUNTIES. | 1874. | | |
|-----------------|---------|---------|-----------------|
| | Tons. | Pounds. | Amount. |
| Elko..... | 5,535 | ..... | \$ 152,556 30 |
| Esmeralda..... | 4,054 | 403 | 294,072 39 |
| Eureka..... | 61,594 | 882 | 2,362,104 56 |
| Humboldt..... | 15,455 | 605 | 279,588 88 |
| Lander..... | 6,942 | 1,939 | 842,115 33 |
| Lincoln..... | 93,828 | 708 | 1,620,925 43 |
| Lyon..... | 87,582 | ..... | 528,697 77 |
| Nye..... | 8,342 | 191 | 356,672 67 |
| Storey..... | 534,338 | 1,712 | 22,525,274 95 |
| Washoe..... | 5,910 | ..... | 26,449 23 |
| White Pine..... | 13,715 | 1,773 | 596,891 63 |
| Totals..... | 837,299 | 213 | \$29,587,349 14 |

SUMMARY—Continued.

Ores and Tailings.

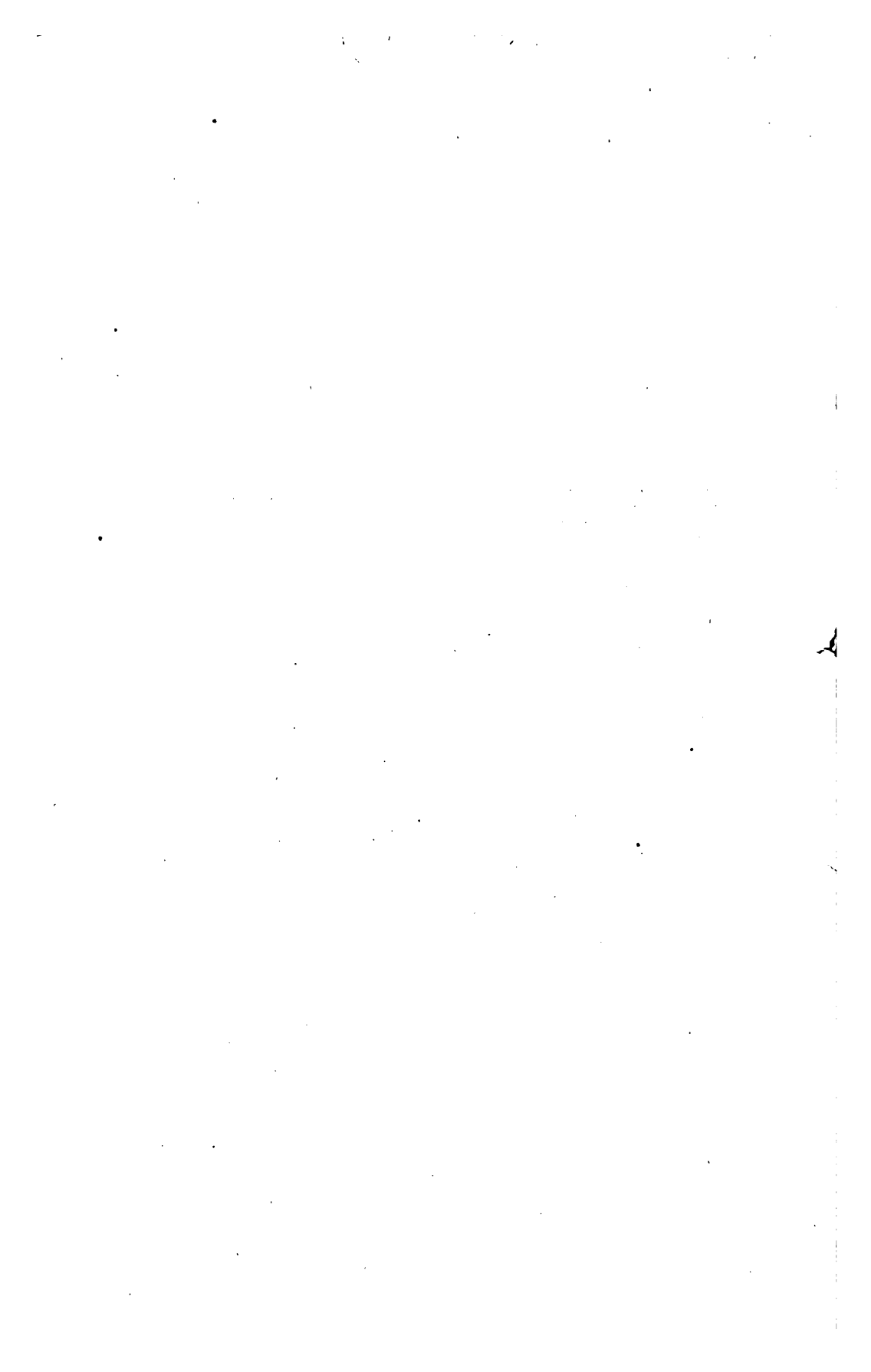
| COUNTIES. | 1875. | | |
|-----------------|---------|---------|-----------------|
| | Tons. | Pounds. | Amount. |
| Eureka..... | 81,474 | 466 | \$3,150,095 10 |
| Elko..... | 7,742 | 564 | 526,603 02 |
| Esmeralda..... | 15,039 | 1,990 | 1,047,962 38 |
| Humboldt..... | 11,313 | 1,355 | 248,256 32 |
| Lander..... | 7,346 | 1,431 | 1,007,506 42 |
| Lincoln..... | 38,722 | 955 | 1,020,416 38 |
| Lyon..... | 67,804 | ..... | 373,684 37 |
| Nye..... | 19,288 | 478 | 980,810 17 |
| Storey..... | 558,256 | 274 | 26,023,036 54 |
| White Pine..... | 15,791 | 28 | 874,215 06 |
| Totals..... | 822,778 | 1,541 | \$35,252,585 76 |

| COUNTIES. | 1876. | | |
|-----------------|---------|---------|-----------------|
| | Tons. | Pounds. | Gross Value. |
| Elko..... | 6,396 | 158 | \$ 480,848 87 |
| Esmeralda..... | 26,158 | 1,000 | 1,504,186 76 |
| Eureka..... | 53,432 | 471 | 2,107,150 46 |
| Humboldt..... | 18,208 | 359 | 231,583 27 |
| Lander..... | 7,051 | 1,992 | 813,378 11 |
| Lincoln..... | 17,921 | 708 | 831,170 32 |
| Lyon..... | 70,378 | ..... | 383,800 45 |
| Nye..... | 16,879 | 282 | 636,283 78 |
| Storey..... | 626,842 | 1,018 | 38,038,145 65 |
| White Pine..... | 14,624 | 701 | 626,928 90 |
| Totals..... | 857,892 | 1,789 | \$45,653,477 47 |

SUMMARY—Continued.

| COUNTIES. | 1877. | | |
|-----------------|---------|---------|-----------------|
| | Tons. | Pounds. | Gross Value. |
| Elko..... | 15,168 | 620 | \$1,075,968 86 |
| Esmeralda..... | 36,731 | 1,984 | 1,508,491 69 |
| Eureka..... | 86,337 | 1,502 | 3,898,878 65 |
| Humboldt..... | 22,342 | 1,480 | 307,223 96 |
| Lander..... | 5,659 | 121 | 595,828 89 |
| Lincoln..... | 22,917 | 101 | 556,095 37 |
| Lyon..... | 59,065 | 1,000 | 406,016 81 |
| Nye..... | 25,897 | 163 | 842,583 73 |
| Storey..... | 633,856 | 300 | 37,062,252 38 |
| White Pine..... | 8,214 | 1,474 | 408,491 52 |
| Totals..... | 916,190 | 745 | \$46,661,831 86 |

| COUNTIES. | 1878—Three Quarters. | | |
|-----------------|----------------------|---------|-----------------|
| | Tons. | Pounds. | Gross Value. |
| Elko..... | 10,103 | 975 | \$ 941,918 94 |
| Esmeralda..... | 11,197 | 1,823 | 469,775 13 |
| Eureka..... | 99,259 | 1,864 | 4,503,267 94 |
| Humboldt..... | 17,938 | 1,800 | 176,403 09 |
| Lander..... | 4,973 | 1,706 | 500,782 03 |
| Lincoln..... | 26,749 | 593 | 460,524 38 |
| Lyon..... | 78,108 | ..... | 471,643 44 |
| Nye..... | 21,888 | 1,744 | 770,088 18 |
| Ormsby..... | 4,875 | ..... | 53,665 86 |
| Storey..... | 320,476 | 758 | 17,989,636 28 |
| White Pine..... | 9,392 | 1,181 | 446,453 71 |
| Totals..... | 604,964 | 444 | \$26,785,158 98 |



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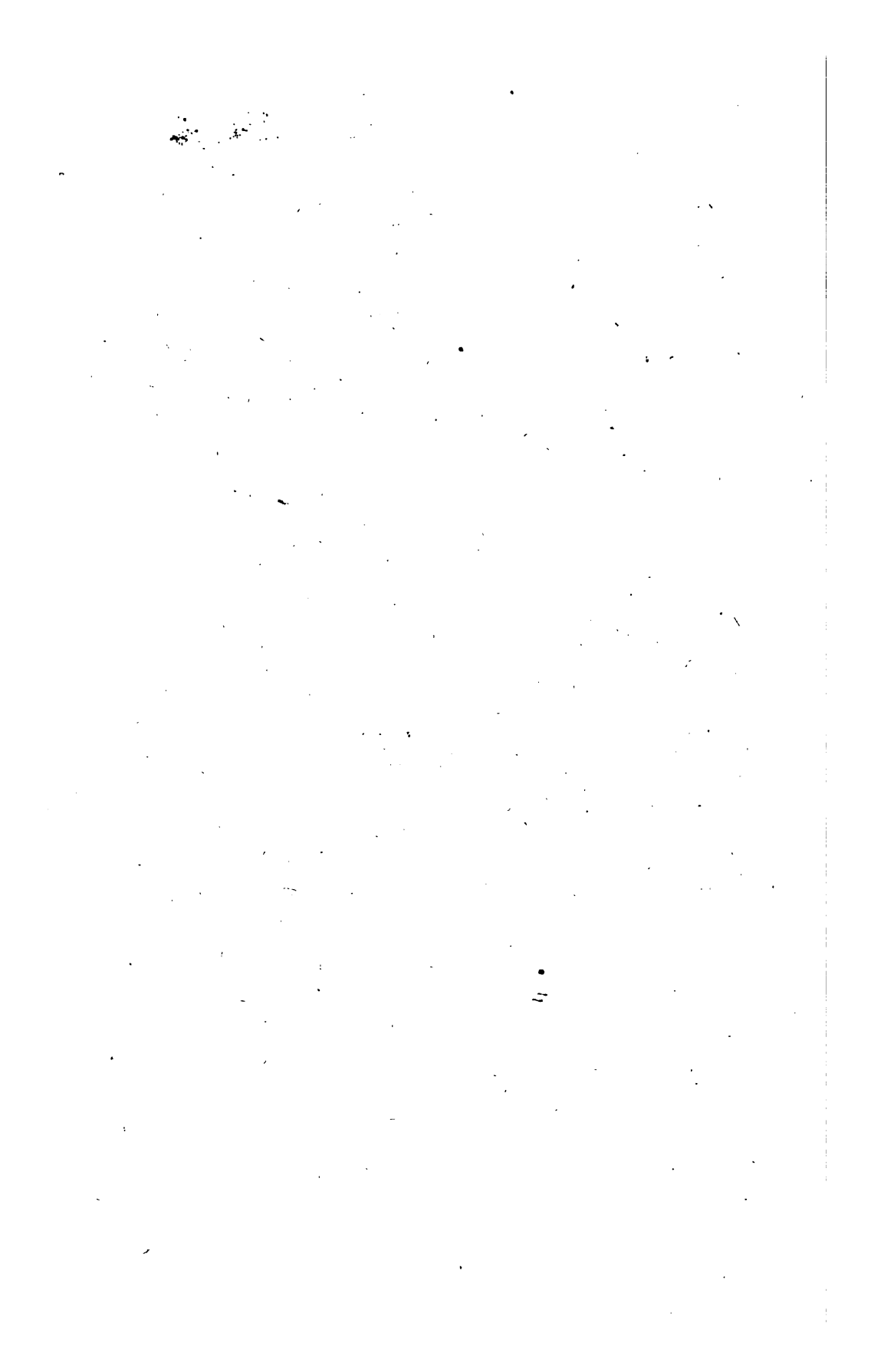
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